# The Builder.

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### *The Local Government Bill.*

THE promised Local Government Bill was introduced and read a first time in the House of Commons on Monday last. The President of the Local Government Board, Mr. Ritchie, was complimented by Mr. Gladstone upon the lucidity of his statement of the scope of the measure, which, so far as can be judged at present, is more far-reaching and thorough in character than had been generally expected. The Bill is large in another sense, — in voluminousness, — and, owing to this cause, it will not be in print for a week or ten days to come. But the measure has such important bearings on the public health as affected by local administration that we give at the earliest moment an outline of its main provisions, so far as they were indicated in Mr. Ritchie's speech, reserving further comments until we have seen and considered the print of the Bill. Whether a measure of this magnitude and complexity is likely to be carried this session is a question upon which we will not enter.

First, then, the boundaries of counties are to remain as they are, and that declaration will be satisfactory to a great many people. A good deal of inquiry has been made by the Assistant Boundary Commissioners in various parts of the country to ascertain what improvement could be made here and there, but the indications of opposition have been numerous; a strong feeling has been created against alteration of ancient landmarks, and, therefore, the county area is to be the geographical county as at present constituted,—except that where an urban sanitary district overlaps its county boundary it is to be held to be in the county which contains the greater number of its inhabitants. Certainly these boundaries need amendment in many places, for there are sixty-five Urban Sanitary Districts and 172 Rural Sanitary Districts which overlap the boundary of the county in which they are chiefly situated; and in the last session of Parliament it was proposed to empower certain Boundary Commissioners to make recommendations on the subject, and rectify these overlapping parts by making their boundaries coterminous with the counties. However, in the main, the county boundaries are to remain unaltered. The proposed measure deals with a sufficient number of things within counties without touching the question of their boundaries.

Each County is to have a Council, consisting of a number of members to be determined upon by the Local Government Board, three-fourths of whom are to be elected by the ratepayers, exactly as town councillors are now elected; and when these have been constituted, they will elect the other fourth part of the number of the full Council, as town councils now do in electing aldermen. Each county is to be divided into electoral divisions, consisting of a sanitary district or a combination of sanitary districts, the ratepayers of each division returning one member to the County Council. One half of the number of the first councillors elected will retire at the end of three years, the other half sitting for six years and then retiring, and so every three years one half of the number of councillors will be elected.

When fully constituted the County Councils will have power to carry out the Rivers Pollution Act of 1876 in any part of the county, not overriding the powers of the Sanitary Authorities in doing so, but concurrently with them. The action of the Board of Trade in consenting to the construction of proposed piers and harbours, tramways, electric lighting, and operations under the Gas and Water Facilities Act, is to cease, and the duty is to be transferred to the County Council, as is that also of the Local Government Board in making provisional orders for the carrying out of the Gas and Water Facilities Acts, and the Council is to represent the Local Government Board, in relation to the Sanitary Authorities, in matters concerning drainage and sewerage. The County Councils will also have powers to fix the market tolls, to fix the scale of water charges, and to control the powers of Urban Sanitary Authorities in carrying out the Public Health Acts, the Artisans' Dwellings Act, and other similar powers. They are also to take into consideration the desirability of promoting emigration, not of paupers, but of those who would probably become paupers unless some assistance can be given to them in cases where they desire to emigrate.

In the matter of the electoral divisions of counties, there is evidently a difficulty in those counties which contain the large towns, and it is proposed to constitute ten of these into counties of themselves, namely, Liverpool, Manchester, Birmingham, Leeds, Sheffield, Bradford, Bristol, Nottingham, Hull, and Newcastle.

Having disposed of these by making them counties of cities, Mr. Ritchie turned his attention to lesser towns, some of which, however, are still of great size, and form, perhaps, the greatest difficulty of all; however, he makes a stand at those Quarter-Session Boroughs which have a population of 10,000 and upwards. These are to retain their existing powers, duties, and exemptions,—with the exception of granting licences, which is to be done by the County Councils. Smaller boroughs than these are to be dealt with differently.

Counties are to be divided into Sanitary Districts, Urban and Rural: the Urban districts will be the municipal boroughs and the Local Board districts. In the boroughs the Town Council will be the governing body, elected as at present, but Local Boards and Commissioners in Improvement Act districts will be elected, not, as now, on the Poor-law vote, but on the same franchise as Town Councils, and as the new County Councils to be constituted. The Rural Sanitary Authorities at present are the Boards of Guardians. The duty of acting as a Sanitary Authority was imposed upon them first by the Public Health Act of 1872, and continued by the Act of 1875, but they are, of course, elected chiefly for Poor-law purposes, and the system has proved to be a cumbrous and unsuitable one for the sanitary government of the rural districts, which contain, many of them, towns of considerable size and population.

It is proposed that counties shall be divided according to population, and that each division or district shall have a District Council, elected in the same manner and by the same persons as the County Council, each of these districts sending a member to the Central Council. The boroughs entitled to one or more representatives will make their own divisions where they have more than one member; but outside these boroughs the divisions will be made by the existing county authority,—the County Magistrates. These will not be superseded by the new County Councils, but will continue to sit as Justices; but their administration in respect of county rates, county buildings, county bridges, lunatic asylums, reformatories, industrial schools, licences for music and dancing, licences for the sale of intoxicating liquors, the polling districts for Parliamentary elections, registration of voters, storing of explosive substances, contagious diseases (animals), adulteration of food and drugs, weights and measures, registration of friendly societies,—all these will be transferred to the new bodies.

The District Councils will take over the powers and duties of Local Boards, which will then cease to exist. The rural sanitary districts will be divided into wards by the County Council, who will fix the number of councillors for the rural District Councils, who will be elected in the same way as the two other new bodies. Every District Council, whether urban or rural, will take over the existing powers in respect of lighting, watching, baths and wash-houses, lodging-houses, and burials, as well as the licences to slaughter-houses, and some other details. Thus the complete organisation in a county will be, the magistrates, for justice; the County Council, for general administrative work; and the District Councils, for the municipal government of their areas,—all elected on the same franchise. The Boards of Guardians will continue to be elected as at present, and will confine themselves to the administraton of the poor law. The School Boards, too, will be independently-elected bodies

This is one of the most serious Bills ever introduced into the House of Commons in its consequences and bearings on the true interests of England. Everything depends upon the sort of persons to be elected to the County Councils. It is not necessary to magnify the position of county gentlemen and consider them to be magnates and persons superior to others, but they have in the main done good service to the State in their offices in counties. If such men will accept the position of members of the County Councils and keep it, and if they will be elected, well and good; the whole scheme will then work admirably, to the interests of the country. But we remember the institution of Local Boards. Then, and for some years, gentlemen who were in every way qualified and suitable for the position of members offered themselves for election, and were elected, and the proper work of Local Boards was conducted harmoniously and in the true interests of the ratepayers, economically as well as properly in other respects; but presently the rich man, who now has nothing to do but collect the rents of his tumble-down houses,—what he calls "cottage property,"—puts himself forward for election to the Local Board, and draws to himself others of like mind though less means, and they persuade a majority of the electors that their best representatives are those who at any risk "keep down the rates," a popular cry which their action on the Board does not tend to realise, but, on the contrary, actually increases them; and in other ways and for other reasons members have been elected with whom gentlemen would not sit,—not because their colleagues were of less consideration in the social scale of society, but because they were so ignorant of the very basis of qualification for so important a post that they could not be kept to any line of reason; at one time voting away thousands upon thousands for something which was of no real value, whether in respect of prevention of disease or of ornament to a town; while at the next meeting they would bring their cheeseparing proclivities to bear upon the most necessary provisions of a Local Board which intended to fulfil the duty of local self-government. Nevertheless, by dint of screwing down the poor on one hand and ousting gentlemen from their seats at the Board on the other, they managed in many instances to keep their places and to perpetuate a system of local government which would be still less suitable for counties than for towns. If the Bill passes, it is to be hoped the country may be delivered from such members as these in the County Councils. In instancing, as we have done, owners of small house property as persons unfit for the position of members of boards of local government, we do not confine the illustration to them; nor do we mean to say that they are more unfit than some others; we mean, however, to say, that all men have their weaknesses, and that it is not for the welfare of the country that a man should use his weakest arm for public purposes.

The metropolis is proposed by the Bill to be dealt with somewhat differently, as befits the case. It is so terribly large that ordinary conditions do not apply to it. London, included under the Metropolis Management Act, is to be taken, for municipal purposes, out of the counties of Middlesex, Surrey, and Kent, and a County of London is to be created, with a Lord Lieutenant, a Bench of Magistrates, and a County Council of its own, in supercession of the present Metropolitan Board of Works' management; not, of course, because of any supposed mismanagement, recent or remote, but because it is considered that on the whole London will be better governed by the new body.

As we have before remarked, it is a very serious Bill in all respects, even in the outline given by the President of the Local Government Board. Its special provisions will need still more consideration before the judgment of the country can be given upon it.

## THE OLD "STYLE" QUESTION AGAIN

AT the Society of Arts on Tuesday last there was read, in the absence of its author, a paper or essay by Mr. W. Simpson, the well-known artist of the *Illustrated London News*, on the subject "What Style of Architecture should we follow?" Although, as it appears, originally educated as an architect, Mr. Simpson now regards the subject from the point of view of an outsider, and, in fact, of an opponent of the architects generally, and propounds views in which he says he has been told he will have all the public with him and all the architects against him. Mr. Simpson's general view being that we should forthwith give up all imitation of past styles of architecture, we may say in the first place that he is certainly mistaken in the supposition that he will have all the public with him, and that for a double reason. In the first place, the majority of the public care absolutely nothing about the subject. In the second place, if Mr. Simpson were in a position to practically experiment upon the public taste by offering designs which were in no imitation of any past style, he would find that those of the non-professional public who pretend to any opinion or preference at all in architecture are exactly those who are most bound down to the notion of copyism in architecture; and that an architect who were to candidly say to his client that he declined to follow any recognised style, and preferred to aim at original design, would by ninety-nine clients out of a hundred be regarded as an unsound, unsafe, eccentric kind of person, and would receive, in the letter or in the spirit, the answer we heard given in one such case, "Oh, come, I am not going to have you making experiments with my building!"

The special opinion of one man may not be of much importance in itself, but Mr. Simpson is no doubt an outside critic of more than average knowledge and perception, and the view which he has advanced, and the arguments and statements by which he has advanced it, are worth consideration, both in regard to the truth contained in some of his remarks, and the error and exaggeration mingled with them. The paper, which will, we presume, be duly published in the *Society of Arts' Journal*, and therefore be circulated among a considerable number of readers, is just the sort of essay that some people will jump at and lay hold of at once as gospel, and dismiss the whole architectural profession with costs, in the court of their own hasty judgments, as people who are all hopelessly at sea, and who, if they are to produce work that is worth anything, ought to set to work at once and make a new style, instead of copying old ones.

Mr. Simpson, it must be said, fully sees the futility of any such proposition. He admits that if architects met together of malice prepense to make a style of their own day, the result must be a failure. For one thing he says, and very truly, that they would not agree as to the character of the style to be adopted. Of course not. How is it possible they should, human nature and human taste being constituted as they are? But Mr. Simpson suggests that a style should be chosen from which to start on a course of new and original development. Does he think that men would agree any better about the starting-point than about the character of a new style to be invented? They could not possibly do so, because men's minds and perceptions are differently constituted, and now that we have such a number of different styles brought before our knowledge by the influence of history and travel, there can be no such unanimous following of one school as existed in days when the architects of each country were in such a comparative state of isolation in regard to what had been done before them or what was being done at a distance from them. Mr. Simpson seems to recognise this fact, but he does not seem to recognise its necessary consequences, and that it is perfectly impossible to expect that a generation of men with every style in the world open to their study can all agree even as to the phase of architecture which they would choose to select as a starting-point.

We are ourselves quite of opinion, and have often expressed the opinion, that in the architecture of this century in England mere copyism has been paramount, and that it has run to a perfectly absurd extreme. The Gothic revival was, in almost all its results, pure copyism; it was even considered by many that anything other than copying was unorthodox. We agree, nevertheless, with Mr. Simpson that it was a more dignified employment to study and reproduce so fine and pure a style as Gothic, than to copy and reproduce the quips and cranks of "Queen Anne." The sheer copyism of these which goes on in many quarters is contemptible, and is not worth calling architecture in any true sense at all. But this must not blind us to the fact that there is a certain amount of picturesque and more or less original architecture being produced now, of a type which has been called "Free Classic," and which in some hands and in some examples may be said to show distinct originality; certainly more originality than usually characterised the Gothic revival.

Like nearly all the critics of architects and architecture nowadays, Mr. Simpson is too pessimist, and pushes his remarks too far even in regard to the architecture of the present day; and he pushes the argument a great deal too far in repeating the old charge, that copyism has been the order of the day with architecture since the Renaissance. In the first place, copyism in one sense or another has always existed in architecture. The individual mind is inherently incapable of originating any perfectly new conception out of its inner consciousness. Look through the whole history of the arts of design, and always you find man copying something, with a little modification or improvement. The main idea is always taken from something that went before, and the production of all the leading forms of architecture was the work of many men, each developing a little further what his predecessors had left him. Moreover, in the pre-copying days, men really all copied from each other, as far as detail was concerned. Even in the Gothic period, when the changes came quicker, and were more marked than in any other pre-Renaissance period, one whole generation repeated all each other's details, only modifying the proportions and general design of the building. And again, it is quite a mistake, and is, in fact, almost a piece of claptrap, to speak of the Classical Renaissance as a period of mere copying. There were a certain number of pedants who wrote pedantic treatises, and built pedantic buildings, in which the sole object was to follow Vitruvius and the Romans; but taking the Italian and French Renaissance age as a whole, there is, in fact, a great deal of variety and originality in the treatment of the Classic materials in that age of architecture. Take the Florentine palaces, for instance; is there no originality and no distinctly-marked variety of style in them? Our modern Classical Renaissance, it is true, like our Gothic Renaissance, was mere copyism; but such was not the case with the Renaissance *par excellence*. It was a period of a great deal of architectural invention.

Mr. Simpson again, like many other pessi-

mist critics, exaggerates very much in such statements as that there are no modern buildings of any success or that give any one any pleasure. Any one to whom such a building as the Houses of Parliament gives no pleasure or seems of no interest must, to our thinking, be architecturally a very dull and stupid person; and the Houses of Parliament, moreover, is a building of most distinct and marked originality. The detail is all Tudor, but the plan and grouping are as original in conception as that of any great building that can be named. Mr. Simpson repeats, too, the old exaggerations about its practical defects, which have been parroted over and over again. He says that members of Parliament want a house in which they can be heard. What members have asked for, with some reason, is a House where there may be seats for all, and where yet all may be heard, and that might be a matter of some practical difficulty; and the necessity of having seats for all, when the average attendance is so much below the total, has been very reasonably questioned. But as for hearing in the present House, we do not know what such complaints mean. The last time we were present at a debate, sitting "under the gallery" (a bad place for hearing, considering that the seats are in a kind of cavern), we heard every speaker from every part of the House quite distinctly for a whole evening, and without any evidence of inconvenient exertion on the part of the speakers. Then Mr. Simpson takes a most absurdly exaggerated view about the utilitarian element in architecture, asking, for instance, why an Imperial Institute requires a tower, and insinuating that such a feature is entirely at variance with the true system of architectural design, as the expression of practical needs. This is a *reductio ad absurdum* of what is within reasonable limits a true enough principle; but principles must not be pushed too far. We are not particularly concerned to defend the Imperial Institute design; but the tower which forms a part of it is no more at variance with architectural logic than is the spire of Salisbury Cathedral. The spire at Salisbury marks the crossing of the nave and transepts, and emphasises this central point in an impressive manner; the tower of the Imperial Institute marks the main entrance and the meeting-point of the main corridors. A tower is only illogical and unarchitectural when it emphasises no point in the plan, and is only a patched on thing; but to complain of a tower fitly placed, merely because a tower is not a *necessity* of the particular building, is to reduce architecture to mere bald utilitarianism. To instance once more the Houses of Parliament: the Victoria Tower is in one sense a perfectly useless adjunct to the building; but architecturally it marks the great state entrance, it is a kind of glorified porch; it is a perfectly legitimate outcome of the design, and a real gain to the scenery of that part of London. "We," who write this, lived for a good many years almost under the shadow of that tower; it was an object daily seen, yet never looking the same two days together, under the influences of varying light and weather; now in glory and glitter of sunlight, now in the gloom of cloud and shadow; it was a daily pleasure, and a thing that added to the poetry of life; and was that not worth doing, merely because there was no special practical or utilitarian object in it? To say so would be to take away the highest and truest *raison d'être* of architecture itself.

No good can be done for architecture by these exaggerated and pessimist views, and it is a pity that critics like Mr. Simpson cannot bring forward the really sensible portion of their views without accompanying them with this kind of exaggerated protest in favour of utilitarianism, and exaggerated depreciation of everything that is done in our own day. With a good deal that is said in Mr. Simpson's paper we entirely agree. We quite concur with him, for instance, in his lamentation over the useless and absurd multiplication of "Corinthian capitals" in modern buildings; capitals repeated all on the old pattern. What ought to be done would be to use this type of capital with new and modified treatment, instead of repeating it mechanically. The same principle will apply to other details whether of Classic or Gothic architecture. We cannot escape from their influence; but, *en revanche*, we ought not to allow them to escape from our influence. Every architect who is worth the name ought, though it is quite impossible that he can be uninfluenced by or can dispense with previous forms, to be able to give his own stamp to them and treat them in his own way, thus by little and little evolving a new form from the old. There is not much of this spirit in architectural design at present, it is true; but there is rather more than Mr. Simpson has noticed or is aware of, and his criticism is incorrect and untrue so far. Perhaps, however, there is no such delusion in it as the sentiment with which he concluded his paper, that if only the works of Ruskin had been studied and followed, the architectural problem would be on its way to a solution. Whenever Mr. Simpson undertakes a systematic study of Ruskin's works with an unbiassed desire to find out what that prophet, who has been made such a fetish of in this foolish country, really has to teach, he may then discover what a few people know, and more will find out, viz., that Ruskin has no fixed ideas or canons of criticism at all in architecture; that what he says in one place he unsays in another; that he is totally and absurdly ignorant of the very alphabet of construction, which is the basis of all architecture; and that he is simply a blind guide with a great faculty of rhapsodising,—and architecture is a matter of building, not of rhapsodising.

## NOTES.

WE have before us the statements of the Institution of Civil Engineers and the Surveyors' Institution in regard to the Architects' Registration Bill. Both these important and representative societies speak in the strongest manner against this scheme, by which a committee of obscure persons have impudently endeavoured to push themselves in front of the great representative bodies of the three professions. The tone of the Institution of Civil Engineers in regard to the scheme is not only hostile, but contemptuous. They draw attention, with what may be considered a pardonable pride, to the position which their Institution has long held as a body the membership of which was a guarantee of professional proficiency; and they add they are at a loss to understand by whom the Bill is promoted, and that it cannot be conceived that any engineers of standing in the profession, or who are really conversant with the functions and practice of civil engineering, are among the promoters. The Surveyors' Institution express their opinion that the Bill, by giving an apparent standing to incompetent persons, would create the very evils it professes to remedy, and that its operation, "should it by any chance become law," would be purely mischievous, more especially by holding out the bait of Registration without Examination to any young surveyor who, before the passing of the Act, should join one out a number of small local and student societies, and thus escape the examination test which is now necessary for membership of the Surveyors' Institution. The whole thing, in fact, is so preposterous that one is almost ashamed of seriously criticising it, and those country societies who are sending up petitions in its favour must be either entirely wanting in common sense, or totally ignorant of the source from which it springs and the methods by which it is being promoted.

THE meeting at the Mansion House last Friday to consider the representation of English Industries at the Paris Exhibition of 1889, resulted in the unanimous adoption of a resolution pledging the meeting to promote the interests of the Paris Exhibition and to use every means to secure an adequate representation of British manufactures. The English Government, as our readers are aware, has declined (for reasons which it is easy to understand) taking part officially in the Paris Exhibition; and therefore a Committee has been formed (with offices at 2, Walbrook) to look after the interests of English exhibitors. The space available for British industries at the Exhibition will be about 150,000 square feet. This does not include the exhibition of works of art, which come into another department of the Exhibition. It may be of interest to add the names of the committee:—The Lord Mayor (President), Lord Brassey (Vice-President), Mr. Mundella, M.P., Sir Lowthian Bell, Sir F. Leighton, P.R.A., Sir J. Lubbock, M.P. (President of the London Chamber of Commerce), Sir Charles Tennant (Glasgow), Sir B. Samuelson, M.P., Sir D. Galton, K.C.B., Sir F. D. Bell, K.C.M.G., Sir Henry Roscoe, M.P., Sir George H. Chubb, Sir A. Fairbairn (Leeds), Prof. Elgar, Prof. Roberts Austen, Sir Howard Grubb (Dublin), Sir V. Kennett-Barrington, Sir J. C. Lee (Manchester), Mr. W. H. Preece, Sir W. T. Lewis (Cardiff), Sir J. D. Linton, Sir Henry Mitchell (Bradford), Mr. George B. Bruce (President Inst. C.E.), Mr. E. H. Carbutt (President Inst. M.E.), Mr. Henry Chapman (M. Inst. C.E.), Mr. Alderman Cotton, Mr. W. Kenrick, M.P. (Birmingham), Mr. James Dredge, Mr. H. D. Marshall (President Agricultural Engineers' Association), Mr. George Findlay (North-Western Railway), Mr. Henry Oakley (Great Northern Railway), Mr. Ernest Hart, Mr. Hunter Donaldson, and Mr. William Woodall (Staffordshire).

SOME remarkable facts, not generally understood, appear in the official records of the metropolitan water supply. London, in the middle of 1887, according to the estimate of the Registrar-General, contained a population of 4,215,192. On referring to the returns furnished by the water companies, we find that the population to which they were supplying water amounted to 5,383,215. The difference represents the population supplied with water by the London companies outside the metropolitan area. The outlying zone in which this population dwells, differs topographically from what is called the "outer ring," but its population is nearly equal in point of numbers, being barely 33,000 less. This is all the difference between what is termed "Greater London" and the population actually supplied with water by the London water companies. On each of the last three occasions when the Census was taken, namely, in 1861, 1871, and 1881, the number of persons per house in what is called "Registration London," averaged 7·8. The average shown by the London water companies has been rather less than this, and has lately been 7·4. How the companies manage to reckon the population is not clear; but they have a ready means of knowing the number of houses. In this particular we gain an index to the growth of London, and find a marked falling off in the rate of increase since 1882. In that year the houses supplied with water by the London water companies showed an increase of 22,165, compared with 1881. But thenceforward, down to the present time, there has been a lessening in the increment year by year. In 1883 the increase was 20,688; in 1884 it was 20,214; in 1885 it was 19,412; in 1886 it dropped to 15,840; and last year the increment became smaller still, being only 13,255. This is less than half the increase shown seven years before, the advance made in 1880 being 27,418. The decline in the increment of the population commenced after the close of 1883, or a year later than the abatement of house-building. In 1883, the increment of the population was 166,750. In 1884 the increment was slightly less, being 166,209. But in 1885 it fell to 142,148, and in 1886 to 117,221. Last year the increase declined to 98,718. Taking round numbers, the increase in the houses during each of the last six years may be represented by 22, 21, 20, 19, 16, and 13. In like manner the increment of the population in each of the last five years may be given as 17, 16, 14, 12, and 10. These figures show that the spread of London into the outlying circle must have received a check.

THE best thing at Mr. Wallis's Gallery, the thirty-fifth annual exhibition of which opened on Monday, is Seiler's "Signing the Treaty between Prussia and the United States at the Hague, 1785" (45), a small highly-finished work containing portraits of Franklin, Jefferson, and Adams, members of a group of which every figure has its character and tells its story, especially that of the man with his back to the spectator and holding the deed; his very back is diplomatic. Professor Holmberg's "Chess in the Sacristy" (43) is a very brilliantly-painted rich interior with two or three ecclesiastics who are not nearly so interesting as their surroundings; two of them are studied life-size in a painting entitled "Words of Comfort" (87), and are no more interesting on that scale. Laupheimer's "Hope of the Family" (55) is far better painted than the subject is worth; it is apparently supposed to be humorous, but the humour is very heavy. An interior by W. Firle called "Spring and Winter" (37) belongs to a class of interior subjects which have become popular of late, in which one or two figures are relieved against the light of a window partly screened by a transparent blind. This effect is so often repeated now that it has evidently been recognised as a favourite arrangement. In this case the figures are of an old man listening to a young Puritan-like woman playing on a piano; the picture is a good specimen of its class, but not one of the best. Joanowits's large Montenegrin picture (17) has not so much of dramatic point and interest as some of his previous works, and the painting is rather hard, both landscapes and figures. Two little subjects in the manner of E. Frere, "Dolly's Dressmaker" (86), by H. Dargelas, and "The Young Connoisseur" (91), by Duverger, who may be considered the legitimate successor of Frere, are very good, the latter especially. There are several large landscapes by Heffner, in his now well-known style, of which the best, "Moonrise after Storm, on the Road to Ostia" (70) hangs at the top of the room; the pervading grey and subdued light and colour proper to the scene have enabled the painter to give a remarkable luminosity to his rising moon, from which a faint light seems actually to radiate; there is a little of trick in this, but it is successful in its aim. "Vernal Tints, Italy" (31), is a large landscape by the same artist, of a different type; the group of trees on the left justifies the title, but the distance is the distance of the Bavarian flats over again. Perhaps the best work of Heffner's in the collection is a very small one, "Bavarian Homestead, early Morning" (26). Israels's "Old and Worn Out" (76) is hung in a bad light, which may be one reason for its comparative failure; but the faces seem very carelessly painted, though the composition and the sentiment peculiar to this master's pictures are recognisable. In the room upstairs is a large "Autumn" (101) by Heffner, one of his most mannered productions; a figure called "Astarte" (104) by Gabriel Max, which reaches the very depths of vulgarity; and one of the late A. Mauve's poetic sheep pictures, "Returning to the Fold" (105).

THE collection of paintings of Fontainebleau interiors, by Mr. Haynes Williams, which are being exhibited at the Goupil Gallery, under the alliterative title, "Fair and Famous Fontainebleau," though hard and toneless as paintings, appear to have been very carefully executed as representations of the sumptuous though meretricious detail of the period. As such they should be of considerable interest to architects and decorators, and the associations connected with Fontainebleau (the very name of which has a kind of romance about it) give to any truthful representation of its *salons* a great historical interest, too, of another kind; and though we cannot say that we care very much for the works as pictures, the collection is of value on the grounds we have named, and shows much conscientious care in regard to the rendering of the multitudinous detail of the interiors.

THE exhibition at Messrs. Tooth & Son's Gallery contains some very good pictures, among others, Mr. H. W. B. Davis's beautiful work, "Summer Time" (87), which was in the last Academy Exhibition, but is well worth seeing again. Among the landscapes a very refined and beautiful work by M. V. Binet, "The Estuary of the Seine" (83), should be looked at. The small views in Venice by M. Gallegos (1, 8, 103) are most brilliant pieces of architectural painting. The large picture by Herr Eisenhut, "The Snake Charmer" (11), is an Oriental subject, showing a crowd of figures under strong sunlight, very ably painted, but rather deficient in point and interest as to subject. Two paintings by Herr L. Deutsch, "News from the Soudan" (63) and "Outside a *Café*, Cairo" (104), are works of unusual power in colour and finish of execution.

IN the collection of water-colour drawings and pencil sketches of Oxford, by Mr. Fulleylove, now to be seen at the Fine Art Society's Gallery, we have a most interesting series of architectural scenes, interesting both in an artistic and a historical sense, by a painter who has a special faculty for treating this type of subject. The subjects chosen include street views in Oxford, as well as the gardens and quadrangles of the colleges with their surrounding architecture; and some of these street views are among the best things in the collection. There are especially to be noted several very small drawings, highly finished in detail; among these "The High-street" (27A), "The Cornmarket" (19), and "The Interior of Christchurch Cathedral" (23), are especially admirable. Among the larger ones none pleased us more than "The old Clarendon Press and Broad-street" (63), both for the treatment of the buildings in the foreground, and the delicately-lighted perspective of the distant street and buildings. In not a few of the subjects Mr. Fulleylove has made much of the beautiful effect of large level grass lawns in combination with an architecture horizontal in its leading lines, of which both Oxford and Cambridge give us so many instances; nothing seems to combine better with level green sward than the "fading grace" of some of these college buildings of the Renaissance type. We get a little too much of the "Radcliffe," a dome which we admire not greatly, and which pushes itself into too many of the views: of course it is a characteristic feature of the place. The interior of the Bodleian library is the subject of an interesting drawing. The whole series is well worth a visit.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE seventh ordinary meeting of this Institute for the present Session was held on Monday evening last, Mr. A. W. Blomfield, A.R.A. (Vice-President), in the chair.

*Obituary.*

Mr. W. H. White (Secretary) announced the decease of Mr. Joseph Clarke, F.S.A., a Vice-President of the Institute (whose death was referred to by us last week, p. 197), and also of Mr. C. H. Cooke, F.S.A., Fellow.

Mr. Ralph Nevill.—I should like to say a word with reference to Mr. Cooke, as I was intimately acquainted with him. Although he served his time on the Council, he has not been here of late years. There is one part of his career which may be of interest, and which may not be very familiar to the people in this room, and that is his work as architect to the National Lifeboat Institution. That work was a very important one, and somewhat out of the usual groove of architecture, consisting not only of erecting the boat-houses (with some of which we are all familiar, but also of the construction of very important slip-ways and breakwaters, generally on the most difficult coasts, and exposed to storms of the greatest magnitude. That work has always been carried out by him with, I believe, unfailing success, and without any catastrophe, which says a great deal for the coastructional skill he possessed. Apart from this, he was a man of great uprightness, and, in spite of considerable ill-health, of such kindly and cheerful disposition, as to endear him to all those who knew him (hear, hear).

*The Obligatory Examination.*

Mr. J. Macvicar Anderson announced that forty-eight candidates had presented themselves for the qualifying examination as Associate, of whom forty had passed. [Their names will be found recorded on another page]. Mr. Anderson said it would be seen that these gentlemen had come from many different parts. He was informed by the Board of the Examiners that the class of probationary work submitted, as well as that done at the examination, was very superior to what it was some few years ago, when the Examination was inaugurated (applause).

*The Late Mr. Beresford Hope.*

Mr. Henry Hucks Gibbs, M.A., F.S.A., then read a memoir of the late Right Hon. A. J. B. Beresford Hope (Past-President).

After a few preliminary remarks, Mr. Gibbs said Mr. Beresford Hope's love for architecture was hereditary: Mr. Thomas Hope's attention to that art having, no doubt, first led his son to its study. Mr. Beresford Hope had always considered architecture as the especial handmaid of the Christian religion, and it was ecclesiastical architecture to which he had chiefly turned his mind. When but eighteen years old, he desired to give a marble altar to the church at Kilndown, and did give a stone altar, and caused all the windows to be filled with stained glass; while, with the help of Mr. R. C. Carpenter, in future years he did all that was possible to render that church more fit for its purpose. When the Cambridge Camden Society became the Ecclesiological Society, and removed to London, Mr. Beresford Hope became its moving spirit, and his hospitality, his kindly nature, and the mingled jocularity and seriousness which characterised him, cemented the union of its members. The aim of the Society was to dispel the ignorant opposition, and combat the misguided religious objections, to proper ecclesiastical arrangement which then prevailed Mr. Hope took great interest in the erection of the church at Maresfield, near Bedgbury, designed by Mr. R. C. Carpenter, which the author believed was the first instance of a well-developed chancel in a modern building. He was keen to observe and encourage any indication of artistic talent which fell in his way; and the talent of Redfern, the well-known sculptor, and who was the son of one of his tenants, was developed by his timely aid. Among the many instances in which by advice and substantial assistance, he aided in the repair and adornment of churches might be mentioned the church he built at Sheen, the font he gave to Boston, his constant and substantial aid at St. Andrew's, Wells-street, and the restoration of the Round Church of the Holy Sepulchre at Cambridge. Of the Church of All Saints, Margaret-street, he and Henry Tritton were the munificent founders, and, with Mr. Butterfield's help, he had spared no trouble in the selection of marbles and other materials for its adornment. But Mr. Hope's greatest work in that direction was St. Augustine's Missionary College at Canterbury. Mr. Hope first went to see the ruins of the monastery, after reading a description of them by Mr. Robert Brett; noting all he saw, he conceived a design in his mind, and, after many delays, and having to procure three private Acts of Parliament, he purchased the ruins, together with sufficient land for his purpose. The idea of a college for missionary clergy was first raised by Bishop Broughton of Sydney, was fostered by Mr. Edward Coleridge, and gladly welcomed by Mr. Hope. He committed the restoration to Mr. Butterfield, who could testify to the zeal and interest with which he watched its progress until its completion in 1848; while the buildings themselves bore witness to his wise discernment. Mr. Hope rebuilt almost all the cottages on both his Kentish and Derbyshire estates, and the farm-buildings at Sheen, where he also erected a school-house, all from the designs of Mr. Slater. The author had read that the Gothic revival was already dead while Mr. Hope was still its living and enthusiastic defender; but with that he did not at all agree. The latest example, Mr. Pearson's noble building at Truro, alone was sufficient answer to the allegation that Pointed architecture was dead in England. After referring at some length to the revived school of Gothic architects, Mr. Gibbs said it would be for subsequent generations to determine whether a Victorian style had been evolved, but thought it was impossible to pass through many streets of London without

seeing that the domestic architecture had assumed a character of its own, not uninfluenced by Gothic feeling, though differing much in form. Mr. Beresford Hope was an amateur, but he had escaped the snares which "a little knowledge" laid for man. Those who had worked with him would bear witness that he was the last man in the world to interfere with the technical knowledge and independent judgment of the skilled masters of the art which he loved. In matters of Church and State, as in all else, both in and out of Parliament, independence was his chief characteristic, and he respected it in others. He was a D.C.L. of Oxford in 1848, LL.D. of his own University in 1864, and was made a member of the Privy Council in 1880. He was a trustee of the British Museum and of the National Portrait Gallery, a Fellow of the Society of Antiquaries, President of the Architectural Museum, and the only amateur since the time of Earl de Grey, the first President, who had had the honour of presiding over the Royal Institute of British Architects, the general exponent and mouthpiece of English architecture, or, as he had called it, "the central regulating Areopagus of Architecture." Mr. Gibbs concluded by reverting to the Cambridge Camden Society, to the leaders of the revival of Gothic architecture, and the Institute would, he was sure, not fail to recognise the great services which they had rendered to the cause of architecture. Among them none were more distinguished for zeal, energy, ability, and keen appreciation of the truth and beauty of the cause for which they had striven than Mr. Beresford Hope. He was gone; many of his fellow-workers were gone; but the good they did lived after them, their work remained and their influence remained.

Mr. T. M. Rickman next read a communicaon the same subject, submitted by Prof. Kerr, who was prevented from being present through indisposition.

Mr. C. F. Hayward referred to the fact that Mr. Beresford Hope was one of the two non-professional Presidents of the Institute, and to the great fight at the time of his election.

A cordial vote of thanks was passed to Mr. Gibbs for his paper.

*A Fortnight in Switzerland with Viollet-le-Duc.*

Mr. Charles Wethered then read a paper entitled "A Fortnight in Switzerland with Viollet-le-Duc: a further Sketch of his Life and Works." Mr. Wethered, after referring to the invitation which Mr. Bucknall and he had received, said that it was an education and a privilege to visit ennobling lands with such a companion, who, although then just sixty-three, retained the activity of a strong man of forty. Viollet-le-Duc's stream of mind was perpetual, but of his own achievements not a word fell from his lips. With reference to the use, as often made, of his "Dictionnaire" without acknowledgment, he had remarked:—"Qu'importe? J'ai écrit mes livres à l'usage de tous." Over the simple fare in Alpine châlets and cabins he became joyous as a boy, and made himself a favourite with all. To the perfection of the artist he added the love of the naturalist for all rural sights and sounds, which would in turn call forth some happy remark. From the Auberge of Naut Borant, daily excursions were made, Viollet-le-Duc starting several hours before his companion, who joined him at breakfast. It was to a combination of inexhaustible mental and physical energy, as much as to his scientific knowledge, that they were indebted for his treatise on Mont Blanc. This work afforded proof that Viollet-le-Duc was as conversant with the phenomena of nature as he was with the works of men. Nothing was more awe-inspiring than the sight of Alpine glaciers. All that Viollet-le-Duc had written on the causes, conditions, and effects of glacial action would awaken and retain the attention of his readers. Mr. Sidney Colvin, in the *Nineteenth Century* for 1878, had well measured and condensed the wide range of Viollet-le-Duc's capacities in the following words:—"M. Viollet-le-Duc is a personage of commanding attainments and commanding character, who combines the science of Germany with the lucidity of his own nation, and the methodical energy of ours. In such a personage . . . . we must needs honour the skilful archæologist, engineer, designer, author, the masterly organiser of labour, the pre-eminent critic and encyclopædist of art." An untiring searcher after truth, for the ends of truth alone, his teachings were the conclusions of an authority thoroughly versed in the resources of art, while to the force of his logical diction was added the fascination of a pencil which flowed as freely as his pen. Mr. Wethered continued by referring to Viollet-le-Duc's Lectures, dealing at some length with the subject of Greek antiquity, and said they included a critical and historical survey of the course of architectural art. Victor Hugo and other eminent writers had extolled the west front of Notre Dame as one of the wonders of the world; but Viollet-le-Duc, by his masterly analysis, had ruled it to be so. While religiously preserving the spell of the *genius loci*, he had given a long new lease of life to many historic buildings in France, and had guided the hands and thoughts of a loyal band of artificers. Among his architectural followers might be mentioned Millet, Ruprich-Robert, no longer living, and Messieurs de Baudot, Corroyer, and Trélat, who retained a profound admiration for their leader. Viollet-le-Duc had been ably treated with reference to military works by the late Colonel Charles Chesney, who, in reviewing his "Mémoire sur la Défense de Paris," in the *Times* of the 19th of November, 1875, said:—"Like all that emanates from that remarkable man, it bears the stamp of originality, and power; and as a scientific criticism of what occurred . . . . possesses the very highest merit." Viollet-le-Duc possessed a dignity and grace of bearing which at once impressed all who saw him. He was a progressionist who based the best hopes for the future on the wise use of the teachings and traditions of the past; and belonged to his century rather than to a party or a class. The Museum of Comparative Sculpture at Paris owed its origin to his far-reaching thoughtfulness; and in the last of his able reports to the Government he had formulated the whole scheme which was now realised at the Trocadéro. M. Viollet-le-Duc *fils* had informed the author of his intention to publish the voluminous correspondence of his father, from 1835 to the year of his death, which would include letters written while abroad, often illustrated with sketches hit off on the spur of the moment. Viollet-le-Duc died suddenly of apoplexy, at Lausanne, in September, 1879, before completing his sixty-sixth year. Mr. Wethered concluded with an extract from the *Éloge*, delivered by the President of the Historical Monuments Commission, M. Jules Ferry, which, referring to the Museum of Comparative Sculpture, ended with these words,—"We shall open thus to artists, to *savants*, and to those practically engaged in æsthetic handicrafts, a source of information entirely new, and, at the same time, raise up a true monument to French art to the illustrious man who, by the renovation of ancient monuments, has so deeply influenced the destiny of contemporary art; and lastly to that Commission of which he was the soul, and which will reverently maintain his memory and lessons."

The Chairman, at the close of the paper, said that the members present must have listened to it with very great interest. The younger men, he was sure, would take the advice that in studying Viollet-le-Duc's work with which they were most familiar, viz., his Dictionary, they should not be too much led away by the illustrations to the neglect of the articles in the book. Some of those articles were in reality exhaustive treatises in themselves, and he had always found it a hard task to get his pupils to read the article on "Construction," from which so much was to be learned.

The hour being somewhat late, there was no discussion on the paper, and the proceedings closed with a vote of thanks to Mr. Wethered.

**Registration of Plumbers.**—An issue of certificates granted by the Plumbers' Company was made on the 14th inst. at the Guildhall, Mr. Frederick Machin, Master, presiding, supported by Mr. George Shaw, Chairman of the Registration Committee, and Messrs. W. H. Webb, J. Smeaton, and J. C. Ashdown, members of the Committee. Thirty-seven master and operative plumbers attended from Stalybridge, Oxford, Hereford, Sheffield, Leamington, and various districts of London. On the previous day, an issue of certificates of registration to plumbers in the district of Glasgow and the West of Scotland took place at Glasgow, Councillor W. R. W. Smith, President of the District Council, presiding. Sixty master and operative plumbers appeared and received certificates.

## THE EXAMINATION IN ARCHITECTURE.

At the Examination in Architecture, held at the rooms of the Institute during the week commencing the 12th inst., forty-eight gentlemen presented themselves for examination. The reports upon the probationary drawings submitted, and on the general character of the work executed by the several applicants in the presence of the Moderators, are highly satisfactory. The following forty gentlemen have passed, and are declared qualified to become candidates for the Associateship, namely:—

Ahmadi, Ibraihim Shaik Daúd, Bombay.
Ambler, Louis, Kensington.
Awdry, G. C., Westminster.
Barrett, P. W., Barnstaple.
Brakspear, H. R., Sudbury.
Broad, A., Croydon.
Brown, F., Leadenhall-street.
Butler, A. M., Camden-road.
Cavanagh, M. F., Adelaide.
Cockrill, J. W., Great Yarmouth.
Cooksey, A. W., Pentonville-road.
Dicksee, B. J., Fitzroy-square.
Elworthy, H. C., St. Leonards-on-Sea.
Fox, F., North Finchley, N.
Gordon, H. H., Craven-street.
Hall, C. R. G., Kensington.
Hellicar, E. A., Bromley, Kent.
Hennings, A. W., Furnival's Inn.
Jackson, C. W., Thornton Heath.
Jenkins, D., Llandebie, South Wales.
Jollye, E. A., Lorrimore-square.
Jones, J. A., Sutton Coldfield
Lewis, F. B., Nottingham.
Ling, H., Caterham.
Migotti, A., Red Lion-square.
Mummery, J. C. S., Alfred-place, W.C.
Oertel, O., Roorkee College, India.
Ogden, H., Manchester.
Orr, C., Dublin.
Piper, C. W., Lee, S.E.
Pott, W., Whitehall-place.
Ryde, F. C., Woking.
Silcock, S. P., Warrington.
Sirr, H., Highgate-road.
Smart, A. C., Melbourne.
Taylor, F., Bryanston-square.
Town, W. H., Granville-square, W.C.
Walker, A. C., Hobart, Tasmania.
Watson, P. H., Farnham.
Winny, T. H., Aldgate.

## THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

### MEETING AT MAIDSTONE.

A HOME COUNTIES District Meeting of this Association was held at Maidstone on Saturday last. There were present Mr. J. Gordon (Leicester), President of the Association; Mr. C. Jones (Ealing), Hon. Sec. of the Association; Mr. Thomas Cole (Secretary), Mr. O. C. Robson (Willesden), Hon. District Secretary; and Messrs. Lewis Angell (West Ham), E. B. Ellice Clark (London), W. Brooke (Richmond), J. C. Pilditch (Battersea), W. Santo Crimp (Wimbledon), H. P. Boulnois (Portsmouth), G. R. Andrews (Bournemouth), T. de Courcy Meade (Hornsey), — Eayrs (West Bromwich), W. Weston (Paddington), — Banks (Rochester), — Weaver (Kensington), — Strachan (Chelsea), — Savage (East Ham), — Leete (Luton), — Brumell (Finchley), — Jameson (Hackney), — Pollard (Hendon), F. C. J. May (Maidstone), J. Hooley (Maidstone), — Godfrey (King's Norton), J. H. Goodyear (Colchester), F. Baker (Canterbury), — Harding (Epsom), W. H. Fry (Alverstoke), Walter Jennings (London), and other members and friends to the number of about forty in all. Arriving at Maidstone shortly before noon, the members proceeded at once to the Townhall, where they were received by the Mayor and a large proportion of the members of the Corporation.

The Mayor (Mr. E. Waterman) having said a few words of welcome, surrendered the chair to Mr. Gordon, the President of the Association, who, after replying to the greeting of the Mayor, said that the first business was the election of a District Secretary. On the motion of Mr. Charles Jones, seconded by Mr. De Courcy Meade, Mr. O. C. Robson was re-elected.

Mr. Francis C. J. May, Assoc.-Mem. Inst. C.E., then read an interesting paper entitled "A Review of the Sanitary and other Improvements in the Borough of Maidstone during the last ten years." The author went a little out of the beaten track of the papers usually prepared for these meetings by first recounting in a short

and concise way a few of the historical facts connected with the borough of Maidstone in early times. In the course of these remarks he said that before the year 1871 there was but one bridge over the river Medway within the borough boundary. The first was said to have been constructed of timber. It was replaced in the fourteenth century by a stone bridge, 11 ft. wide only between the parapets. Subsequently it was widened to 19 ft., but the date of this work was uncertain. In the year 1808 the width was again increased to nearly 27 ft., and the waterway was confined within five arches instead of seven as before. This bridge, in its turn, was superseded by the present handsome structure (of which more anon) in the years 1879-80. The first charter of incorporation was granted by Edward VI., and is dated July 4, 1548. There have been five several charters granted since, the last being dated June 17, 1747. Some of the by-laws passed by the Town Council in Elizabeth's reign appear to us very amusing, but one at least might be very useful even in these days: it decreed that every young man "that liveth idly in the town" was to pay 6d. (equal to 10s. at the present time) to the Corporation for every day "he should be found idle and not using his art"; and if on conviction the money were not forthcoming, he was "to be imprisoned by the Mayor until he should reform himself." The same by-law applied to "unmarried women under the age of forty years who were out of service."

With regard to the river Medway, the traffic of the river had always been a great benefit to Maidstone and the neighbourhood, but before the water was "penned" up the movement of vessels depended upon the state of the tide. In 1628, the first Act of Parliament was passed for improving the condition of the river. A second Act was passed by the Parliament of 1661-4, giving power to erect locks on the Medway, and to deepen it and construct a towing-path or horse-way. Other Acts have been passed since for similar purposes. The mayor in former times was the Conservator of the river, but its management was now vested by Acts of Parliament in two companies. The Upper Navigation Company has jurisdiction above, and the Lower Navigation Company below, Maidstone. That eminent engineer, Sir William Cubitt, on being consulted upon some proposed alterations, spoke of the canalising of the Medway as a very fine piece of inland navigation engineering. The jurisdiction of the two companies extends from Tonbridge to the Thames at Sheerness, a distance of fifty-four miles.

*Water Supply.*—In Elizabeth's reign the inhabitants obtained their chief supply of water from an excellent and copious spring at Rocky Hill, which was conveyed in pipes across the Medway to conduits in High-street. In 1819 the Commissioners of Pavements increased the supply, made larger reservoirs, and laid down new pipes, transmitting 30,000 gallons daily to seventeen public conduits. In 1860 the Maidstone Waterworks Company was founded, and acquired an Act of Parliament to supply the town with water from a number of springs within a distance of two miles from the pumping-station near Farleigh Bridge, about two miles westward from the town. At this time, with the exception of the water supplied to the public conduits free, the inhabitants drew their water from wells, which in many cases were in dangerous proximity to the house cesspool, and most of them during recent years have had to be closed by reason of their polluted condition.

*Gas.*—Gas was introduced into Maidstone in 1821 by a Mr. Gosling, who in 1823 sold his works to several of the inhabitants, who formed the Maidstone Gas Company.

*Public Baths.*—In 1851 public baths were built by the Corporation at a cost of 6,000*l.*, under the provisions of the Public Baths and Washhouses Act.

*The Charles Museum.*—In 1855 Mr. Charles, of Chillington House, bequeathed to the town his collection of antiquities, and some of his books and pictures, with a request that they might be permanently preserved and known as "the Charles Museum." The Corporation gratefully received the gift, and at a ratepayers' meeting the Public Libraries Act, 1855, was adopted. Chillington House was purchased by the town for the exhibition of the collection, and the museum was opened in January, 1858. This formed the nucleus of what is now one of the largest, most valuable, and interesting museums in the provinces, principally due to the gifts of Mr. Julius Lucius Brenchley, a native of Maidstone, who also presented the very picturesque public gardens adjoining the mansion to the Corporation in 1872.

*Maidstone New Bridge.*—In 1874 the old bridge was reported to be in an unsafe condition. It was also generally acknowledged that it was totally inadequate to the increased and ever-increasing traffic, and that the time had arrived for the construction of a more commodious bridge. This was the first of the great improvements completed within the period to which the paper more particularly refers. Sir Joseph Bazalgette, C.E., was consulted, and, acting upon instructions, designed the present handsome bridge. So great an undertaking naturally provoked much discussion. There was a divided opinion as to the relative merits of iron and stone as the materials of which the bridge should be formed. Sir Joseph Bazalgette said he had no predilection in favour of stone, but, after giving the subject his most careful consideration, advised that the bridge be built of stone, for the following reasons:—1. A stone bridge of three arches is *cheaper* than an iron bridge of one span. 2. A stone bridge is stronger. 3. A stone bridge is more durable. 4. A stone bridge requires no expenditure for its maintenance. 5. A stone bridge of three arches gives a greater waterway. 6. A stone bridge, in his opinion, is more handsome. 7. A stone bridge is more in harmony with the surroundings, more particularly the old parish church, the college, and the archiepiscopal palace. Mr. May thought he might say with confidence that the public were now quite satisfied that the Authority acted wisely in adopting Sir Joseph Bazalgette's design in stone. The first pile of the new bridge was driven on the 24th of October, 1877, and the bridge was opened for traffic on the 6th of August, 1879, by the then Mayor, Alderman Ellis, at the present time Chairman of the Drainage Committee. The bridge is formed of three arches, giving a clear waterway of 149 ft., or 32 ft. more than the old bridge. It is 40 ft. wide between the parapets, and is divided into a carriageway of 24 ft., and two foot pavements, each 8 ft. wide. The structure is of Cornish granite, the spandrels and parapets being of Kentish rag stone, with granite pedestals, mouldings, string-courses, and coping. The carriageway is granite macadam, the foot pavements granite slabs, 7 in. thick. Mr. H. Law was the engineer in charge; and Mr. Ventris, now of the Strand Board of Works, was the resident engineer. The work was carried out by the late Mr. Webster. It cost, including land and buildings purchased, compensation paid in order to improve the approaches, law charges, &c., 59,468*l.* Of this sum, 24,000*l.* was subscribed by the Rochester Bridge Wardens, and 35,468*l.* was borrowed, for sixty years, on town bonds, at 4 per cent.

*Sewage Works.*—The houses were, as a rule, drained into cesspools, by which the soil was completely riddled and polluted, as they had increased in number with the increase of the population, and by the lapse of time had become most foul and pestilential. The Pavement Commissioners sought to minimise the evil by allowing some of the drainage to be connected with their storm-water drains and discharge into the pen of the Medway, but this in course of time created a serious nuisance in the river. The sanitary condition of the town was, therefore, the subject of great complaints in many quarters, and it was felt that an efficient and comprehensive system of drainage could not longer be delayed; therefore, in 1875, the Corporation, acting by the Council as the Urban Authority under the Public Health Act, 1875, determined to provide a sewerage system for the town. Mr. Bailey-Denton, Mr. Baldwin Latham, and Mr. Lewis Angell, the respected first President and father of this Association, were each consulted upon the question, with the result that Mr. Angell's scheme was adopted. Messrs. Neave & Sons were the contractors. The first tender was accepted in 1877, the last in 1880, and the work was completed in 1881. The cost was:—Sewers, manholes, &c., 43,996*l.*; outfall works, 9,000*l.*; land (seven acres), 1,822*l.*; compensation, law and engineers' charges, &c., 5,000*l.*; total, 59,818*l.* As far as possible the separate system was adopted. The original scheme comprised 15¼ miles of sewage drains, 6½ miles of surface drainage, independently of 4½ miles of existing drainage, which was utilised principally for surface drainage. The town has considerably increased since this system was completed, and new sewers have been constructed to the extent of about 4 miles. New surface drains have also been constructed, and others are in contemplation to the extent of about two miles. There are now but very few complaints of smells emanating from the sewer ventilators in the surface of the streets. The system of sewers has been cut up into sections. As far as possible, each length of sewer or district section has been made to ventilate itself by the introduction of light iron flaps attached to the end of the sewer on the upper side of the manholes. By this means the sewer-air is prevented to a great degree from passing from the lower to the higher levels, and so becomes almost equally distributed, instead of culminating at the highest points, as it used to do. One point of great interest on this subject is the fact that the liquid refuse from the Tovil Straw Paper Mills, which was admitted to the sewers in 1884, and which contains a very large quantity of caustic soda, used in the boilers in which the straw and esparto grass are prepared, has a perfect deodorising effect upon the sewage, and as it traverses the whole length of the lower intercepting sewer, it has rendered us good service in the matter of smells. Mr. May said he was of opinion the foulness of the sewers, such as there was, was mainly attributable to the foul condition of the house-drains, many of which are but very imperfectly flushed, as the Authority has not yet seen its way clear to compel a supply of water to be laid on to every closet, and until this is done he was afraid he should be unable to report the system as perfect. All the sewage flows by gravitation to the Outfall Works at Allington, about one mile north of the high-level bridge on the west side of the Medway. As the town is divided by the river, the sewage of the east side is conveyed to the west side by a syphon laid 6 ft. below the bed of the river, a little north of the high-level bridge. The outfall sewer to the works is of concrete 3 ft. in diameter. The outfall sewer leading from the works to the tideway of the Medway below Allington Lock, about one mile in length, is formed of concrete, egg-shaped, 5 ft. by 4 ft., having a gradient of 1 in 1760, and forms a storage drain for the effluent from the tanks during the high tide. On reaching the outfall works the sewage is first screened. The screens were originally lifted by hand, but Mr. May has now arranged a very simple plan for lifting them by machinery. The milk of lime was also originally arranged to flow direct into the tanks; but as he found it did not become sufficiently incorporated with the sewage to cause any great amount of precipitation, he removed the lime-mixer to a building near the screen chamber. He also erected a grinding-mill in the same building, preferring not to slake the lime before putting it into the mixer. He now adds the milk of lime to the sewage at the rate of one ton per 1,000,000 gallons at the screen-chamber, and he finds that during its flow to the tanks, a distance of about 85 yards, it becomes much more thoroughly incorporated with the sewage, and so a greater degree of precipitation is promoted. There are but two precipitation tanks, each 150 ft. long, 27 ft. wide, 3 ft. deep, giving a total capacity of 78·975 gallons. The system of treatment is that of precipitation by lime only, the effluent, as before stated, passing by the outfall sewer to the tidal part of the Medway. As the land was the site of an old quarry, there were large holes into which it was thought the liquid sludge might be pumped for an indefinite period, that the water would drain from it into the soil naturally, or to be assisted by artificial drainage, if necessary. This tentative and crude system was considered all that was necessary for the moment, as some time would elapse before all the house connexions could be made, and the delay would give time to ascertain what was absolutely to be done, and how best to deal with the sewage. This system was continued as long as possible. The natural holes were at last filled with wet sludge, and by embankments, &c.; they had been increased so as to enable them to hold as much as possible; the ground at last became sewage sodden, and percolation into the soil became stopped. In December, 1885, quite a dead-lock was caused through the banks giving out and allowing a large quantity of the sludge to flow like a stream of lava down the slopes of the wood direct into the Medway. It then became

necessary to reconsider the whole question of sewage treatment. Mr. May suggested various ways of overcoming the difficulties, and it was ultimately decided to continue the system of precipitation by lime, or any other better agent, should one be discovered, and to deal with the wet sludge by pressing, hoping to dispose of the pressed sludge to farmers. The situation of the outfall works is peculiar. There is no access to them but by the river,—"the king's highway." The whole of the land planted with wood on the river front was a sloping bank almost to the edge of the river. When the works were constructed, the bank was excavated to a considerable depth below the water-level for the formation of the tanks, and the ground was found to be so very treacherous that it was not possible to build the tanks as was first intended. Before the works could be enlarged it was necessary to level a considerable portion of the land above the tanks. Fortunately there was a favourable opportunity for doing this during the winter of 1885-6, under the auspices of the Labour Relief Fund, which was started for the benefit of the unemployed. In 1886 Mr. May's plans for the necessary buildings and machinery were approved, at an estimated cost of 2,200*l.*, which sum was to be borrowed. The usual inquiry was held, the plans approved by the Local Government Board, and the loan granted for thirty years. The buildings consist of press-house, boiler-house, coal and lime stores, lime elevating shed and sand store. The machinery consists of two 3 ft. 6 in. Drake-Muirhead sludge filter presses and pumping engine; one 25-horse power Lancashire boiler; one donkey-pump, for feeding the boiler; one 5-horse power engine to drive lime-elevating and sludge-agitating apparatus; one water-tank; and one cast-iron sludge reservoir, 12 ft. by 12 ft. by 6 ft. deep, holding 5,000 gallons. The advantages claimed for the Drake-Muirhead presses are:—1st. Simplicity and economy of working by direct-acting pumps, instead of compressed air. 2nd. Reduction of the annual cost of working, both in wear and tear of machinery, and in the renewal of the filtering material by the abolition of the usual cloths. 3rd. Greater rapidity of filtering, whereby cakes may be turned out in half an hour, working with a pressure of 80 lb. to 100 lb. per square inch. As there had been numerous inquiries about these presses, and as the experience of upwards of a twelvemonth's working had been eminently satisfactory, perhaps a detailed description of them would be acceptable. They mainly consisted of flanged cast-iron rings or frames, alternating with plain wrought-iron discs. These discs were covered on both sides with coir fibre, specially prepared for the purpose. It did not decay rapidly even in sewage, and indeed seemed to stand better when continually damp than when dry, or alternately wet and dry. The form of construction was the result of numerous experiments which were carried out by the makers before the Corporation adopted the presses. The mats were attached to the discs in such a manner that they did not need any attention till the material was worn out. In one case the material had lasted upwards of twelve months, during which time the mats were never removed from the discs. This avoids the expense incurred in the frequent removal of the usual cloths for washing and repairing, the only real expense being the cost of removing the material when entirely worn out, which for presses like those at Maidstone, having thirty chambers, each of 3 ft. internal diameter, costs 10*l.* per press per annum. Although the mats themselves formed a sufficient filtering medium, they would eventually become choked up if used alone, and to counteract this tendency it was advisable to use some kind of sand on the surface of the mats, and further by so doing the cakes left the mats very freely when the press was opened. Each press was capable of turning out five tons per day of ten hours. The presses had been working since the 3rd of January, 1887. They had turned out on the average about forty-five tons of pressed sludge per week, which was all they had to deal with. At the present time the pressed sludge was given away, but it was hoped to realise something for it after having ascertained its manurial value by actual use. Dr. Voelcker had stated its value at from 12*s.* to 15*s.* per ton.

The presses are supplied with sludge by means of a direct-acting pumping-engine. This engine pumps the sludge direct from the sludge storage tank into the presses, without the intervention of compressed air, thus constituting a very simple arrangement, and obviating the use of receivers, with their attendant inconveniences, and loss of time and waste of power. The engine is of the horizontal duplex type, *i.e.*, the piston of one actuates the slide-valve of the other, and the plungers make a sufficient pause at the end of each stroke to permit the pump-valves to close without concussion. These valves were specially designed to overcome the difficulties hitherto experienced in pumping sewage sludge. That this object had been accomplished in the present case would be readily understood when it was stated that although they were fitted with movable covers to give ready access to the valves, yet it had not once been necessary to take off a single cover during the whole time they had been working. The pumps were of the plunger or ram type, which had the advantage over piston-pumps, that the packing was outside and easily get-at-able, an important matter where gritty sludge has to be pumped.

Since all the house connexions had been made, and the system extended to deal with the increase of the population, the tanks had proved to be of insufficient capacity to admit of a proper degree of precipitation. The average daily flow of sewage in dry weather had been ascertained to be about 900,000 gallons. On a moderately wet day it had been ascertained to be nearly 1,900,000, so it was estimated that in continual wet weather it could not be less than 3,000,000 gallons per day. These facts had led Mr. May to urge strongly upon the Authority the necessity of completing a perfect system of surface-water drains as soon as possible. The two existing precipitating-tanks were, of course, worked alternately, *i.e.*, three days each. As each had a capacity of only 39,487 gallons, it was obviously impossible to obtain a clear effluent. The outfall was within the jurisdiction of a neighbouring Rural Sanitary Authority, who had complained of the unsatisfactory quality of the effluent. Mr. May had therefore been instructed to prepare a scheme which would ensure a satisfactory effluent at the least possible cost. He prepared a scheme and submitted it to the Drainage Committee on the 15th of February last. It was still under the consideration of the Committee, but he had their permission to exhibit the plan and explain the scheme, as he thought there might be some points of interest therein. The chief points to be kept in mind were three:—1. That more perfect precipitation is needed. 2. That the resultant sludge must be conveyed back to the presses. 3. That the whole of the additions must be arranged so that the existing buildings and plant might be utilised with but little alteration. These points rendered it compulsory to lift the sewage. There was also a great advantage to be gained by lifting; it would enable the tanks to be constructed above the river level, and to reduce the depth of excavation. This was of exceptional importance, owing to the peculiarly treacherous character and situation of the land. He proposed to erect a new set of tanks for the day flow, and to utilise the old tanks for the night flow, which would be let out in the morning and lifted with the morning flow. There were various available ways of lifting the sewage, such as ordinary reciprocating pumps, centrifugal pumps, chain pumps, and elevating wheels. After giving due consideration to these various methods, Mr. May was of opinion that the elevating wheels offered the greatest advantages, taking all things into consideration, viz., for simplicity and cheapness so far as concerned working expenses and the annual wear and tear. The proposed elevating wheels would be of 27 ft. diameter, and were each calculated to lift the sewage a height of 18 ft., from which it would flow to the new tanks by gravitation. The power required to drive each wheel would not exceed three-horse nominal. To provide this, and power for other adjoining machinery, two 5-horse power horizontal engines will be fixed between the wheels, as shown on the lowest floor of the new engine-house, to be supplied with steam from the boiler-house. Each wheel will have thirty-six buckets, and revolving at the rate of five revolutions per minute will lift 66,000 gallons per hour, or 1,584,000 gallons per day of twenty-four hours. Of the engines just mentioned one will be new, the second will be removed from the press-house, where a larger one will be required, as will be explained later on. On the same floor as these engines there will also be fixed two lime-mixing machines, also driven by these engines, from whence the milk of lime will flow to the sewage to become mixed and well incorporated with the sewage in the process of lifting. The second floor of the engine-house, which will be on a level with the land, is arranged as a lime store, in which will be placed a grinding-mill, always worked by the engines underneath, and from which the lime-mixers will be filled by hoppers. Each wheel, engine, and other machine is capable of doing the whole day's duty separately in dry weather, and when coupled together to do all the extra work in wet weather. In the case also of repairs being needed, the sewage system, by this arrangement of duplicate machinery, need never be at a standstill, as is now the case very frequently. The sewage, when treated with lime and lifted by the wheel, will flow into an open trough or channel, in which there will be bafflers and a fixed screen, fitted with an automatic scraper or rake, on an endless chain driven by the before-mentioned engines. By these means the lime and the sewage will become well mixed, the screen will always be kept clean, and the rake will deliver the solid substances into a trolley provided for the purpose. The rake will traverse the screen very slowly, but the speed will be capable of adjustment according to circumstances. The limed sewage will flow along a channel between two rows of ten tanks partly on our own land, but the greater part in Mr. Styles's meadow adjoining. A gate will be placed in the channel in a line with the end of each pair of tanks, and there will be a gate from the channel to each tank. By this arrangement the flow of sewage may be arrested or regulated so that each tank, or each set of tanks, will be filled in rotation or otherwise, as may be necessary or convenient. Each tank will be provided with an outlet valve and pipe for the effluent water, which will be drawn off from the top by means of floating arms, and will be conducted forwards by a drain to the existing outfall sewer. There will also be an outlet sluice valve and pipe for the precipitated sludge, which will pass into a drain, and by gravitation flow backwards to the sludge reservoir under the engine-house. Each tank is 40 ft. long, 30 ft. wide, and 5 ft. below the inlet. Its capacity is 37,500 gallons, therefore twenty tanks give a total capacity of 750,000 gallons. Assuming that they are kept working sixteen hours per day, and are filled and emptied four times, allowing the sewage three hours to rest, and one hour for filling and drawing off and sweeping out the sludge, this will give a total capacity of 3,000,000 gallons per day. The effluent, as before mentioned, being conveyed to the outfall sewer, requires no further treatment. The sludge, on the contrary, having flowed to the sludge reservoir, where the supernatant water is drawn off by means of a floating arm, has to be pumped up to the mixing-tank, *en route* to the presses. It is estimated that the quantity of sludge will be quite doubled, and as this part of the work must be done regularly, a duplicate set of sludge-pumps will be required.

Having described further details of the proposed new sewage-works scheme, Mr. May proceeded to refer to other matters of sanitary interest, including road repairs, foot pavements, the disposal of house-refuse, street scavenging and watering, public gardens and recreation-grounds, markets, &c.

In the course of the discussion which followed the reading of the paper, Mr. May's scheme for the proposed new sewage works was criticised in some points of detail, and subsequently the existing works were visited, the members and visitors being towed thereto in a barge. When the peculiarly awkward nature of the site was seen, and other points discussed *in situ*, several of the members who had been foremost in their criticisms in the morning saw fit to considerably modify their views, and gave expression to their altered opinions at the dinner which was held in the evening. It would certainly have been more convenient, and would have conduced to a better understanding of the proposed scheme, if the visit had been made to the works prior to the reading of the paper. Some of those who were present at the meeting were amused at reading in the *Times* and *Morning Post* of Monday that, after visiting the sewage works, the members visited the county gaol, the hospital for infectious diseases, the museum, &c. As a matter of fact, these buildings, although down on the pro-

gramme, were not visited for want of time. Wonderful to relate, the South-Eastern train, bringing the bulk of the visitors back to London, arrived at Cannon-street to the very minute!

## THE TEMPLE OF JUPITER OLYMPIUS AT ATHENS.

SIR,—In your leader of the 18th ult., on this subject, you say, the evidence is very scanty, and "by its very scantiness, likely to be inconclusive."

In the Hellenic Society's *Journal*, 1886-7, Mr. Penrose says, "The excavations under my directions have resulted in proving that the Temple was octastyle, instead of decastyle as generally supposed." He is not likely to have made such a statement without being sure of it. I believe he will go into the evidence before the Dilettanti Society this year.

The Temple being octastyle, merely leaves us with a literary difficulty in the well-known passage of Vitruvius, *i.e.*, we have an apparently redundant "*et*." The passage in the "Editio Princeps," 1486, is "huius itē exēplar Rome nō est sed Athenis octastilos & in tēplo olympio." The edition of 1497 has the same words; the copy I have has been corrected in ink, apparently for a new edition; the "*et*" has been crossed out, and "*Jovis*" put in; but in the next edition by Fra Giocondo, 1511, the passage is the same except that "Jovis" is added, and "olympio" is changed to "olimpii," "sed Athenis octastylos et in templo Jovis olimpii."

In the next edition, the "Giunta," also by Fra Giocondo, 1513, the reading of the last edition is kept; the same text is kept in the next of 1522, and in the false Giunta of 1523. In the Annotations of Philander, 1557, he says, "I expunge the particle '*et*,'" but gives no reason. In Barbaro's edition of 1567, the passage stands, "sed Athenis Octastylos in templo Jovis Olympii," and also in the edition of Philander, 1586, but with a comma after octastylos, and in the "Elzevir" of 1649. In the Galiani of 1758 the "Jovis Olympii" is kept, and the "*et*" restored.

In the "Schneider" of 1807, the passage runs "sed Athenis octastylos, et in templo Olympio," of which you give a literal translation. My reason for giving these different readings, is that from Sulpicius, who edited the Editio Princeps, to "Schneider," we have had the advantage of the researches and emendations of all the great scholars, Politian, Fra Giocondo, Barbaro, Philander, Salmasius, Poleni, Galliani, and others. In such an elliptical and crabbed writer as Vitruvius, I think we may fairly say, supposing that he put in the *et*, that he meant there is an octastyle example at Athens, and this example is in the Temple of Jupiter Olympius there. I leave this, however, for scholars to decide. Your proposed reading:—"But there is one at Athens, and an hypæthral hexastyle at Olympia," surpasses Wilkin's emendation, who suggested that the MSS. we have were copied by ignorant scribes, who put "Octastylosin" for in "Asty Jovis," and he thus translated the passage:—"But there is one at Athens, within the city, dedicated to Jupiter Olympius."

I may mention, by the way, that Antiochus Epiphanes is usually believed to have died in 164 B.C., for whom Cossutius built this temple. I am now mainly interested in the temple being said to be hypæthral; why you should say "It may not, then, have been hypæthral at all, as, indeed, there was no need, with a contracted width, that it should be," I am at a loss to comprehend, for in peripteral temples you have to choose between *windows, a clearstory, an open skylight, taking the roof off*, or *lighting the naos artificially*. What I mainly want to say is this, that there seem to have been only two dekastyle temples when Vitruvius wrote, *i.e.*, that of Heré at Samos and Apollo Didymæus at Miletus,—this last, Strabo tells us (lib. 14, cap. 1, clause 5), was burnt by Xerxes, and when rebuilt it remained without a roof on account of its magnitude. The example Vitruvius gives us is the octastyle Jupiter Olympius at Athens, and this was in a precisely similar position until Hadrian's time. I take it for granted that in both cases these temples were not roofed for want of funds; for, supposing the Greeks could not get a tie-beam 77 ft. 6 in. long, which would be about the length required for Apollo Didymæus, and did not know how to scarf, they certainly could have built an internal peristyle. I may, however, remark that the roof over the great hall at the Doge's Palace, Venice, is about 71 ft. in the clear, and the tie-beams carry the ceiling. We know that the Greeks could truss, for a king-post truss is shown in a rock-cut temple in Phrygia, and it is, therefore, most probable that they could scarf.

We know that the octastyle example that Vitruvius gives us was roofless for want of funds, so was the dekastyle one of Apollo Didymæus. In what state that of Heré at Samos was we know not, we only know that it was mentioned by Pausanias. Vitruvius's rule, as to dekastyle temples being roofless, looks therefore very much as if it were deduced from the unfinished one, and was of no value whatever.

GEO. AITCHISON.

*** This letter makes it desirable to supplement the article to which it alludes with a few words of explanation.

We cannot doubt that Mr. Penrose will produce evidence from the result of his excavations that will justify his conclusion in favour of the Temple of Jupiter Olympius at Athens having been octastyle. That is, the temple as finished by Hadrian; but there is ground for expecting that even excavation will give up but inconclusive evidence as to the fact whether it was originally designed to be only octastyle, considering the very strong presumptions to the contrary. These presumptions are based, first on the terms in which the ancients refer to the temple when in the condition of an unfinished ambitious structure, which even in that state had been plundered of a number of its columns,—and then on the anomalous, and, as it might seem, the inadmissibly ungraceful proportions which the narrower plan would force upon the naos. It is well that the general question should be cleared by a due appreciation of the history of the building, in preparation for reception of the evidence which we are looking for as to its final treatment.

Mr. Aitchison's interpretation of Vitruvius commits the author to the enunciation,—"there is no hypæthral decastyle temple at Rome, but there is at Athens, and that is octastyle." Upon this he "leaves scholars to decide." But if he looks again at his Schneider he will see that scholars have already decided,—have decided that no plausible or permissible correction of the text will conciliate sense and grammar; it is irredeemably corrupt, and given over by consent of all the doctors as incurable.

The one point which remains significant in this wreck of a sentence is the collocation of the word octastyle with a reference to this temple; should Mr. Penrose's evidence appear as conclusive to other architects as to himself, this significance becomes very important, but not the less puzzling. Vitruvius, in the introduction to his seventh book, groups together as conspicuous examples of the styles of architecture four of special magnificence and dignity,—two Ionic, the temple of Diana at Ephesus, and that of Apollo at Miletus, both decastyle; the Doric temple of Ceres and Proserpine at Eleusis, dodecastyle; and the Olympium at Athens, of the Corinthian order, as designed by Cossutius for Antiochus Epiphanes. He cites the temple at Miletus without noticing that, like that at Athens, it was unfinished; with respect to the latter, he especially mentions the vastness of the cella,—"cellæ magnitudinem,"—as if quite exceptional; but the width of the naos of the octastyle temple could have been barely 50 ft., while that of the Parthenon measures full 63 ft.

Is it possible that the corrupt passage of Vitruvius has come down to us through manuscripts which had been altered by ancient possessors with clumsy attempts to make the account of the plan of the temple in the time of Augustus agree with the structure as it was economically completed by Hadrian as octastyle?

If we must accept the conclusion that it was so completed, we must not flinch from the question,—how could an apartment so narrow and tall as we have on our hands,—50 ft. broad by 60 ft. high,—be made endurable? But the case is, in fact, more perplexing than it thus appears, and, as already pointed out, the central avenue would be intolerably narrow in relation to height.

As regards the question of roofing, our expression, "with a contracted width it needed not be hypæthral," is perhaps not sufficiently guarded, as it carries an implication against which Mr. Aitchison rightly protests as gratuitous, that the Greeks could not roof a cella of the breadth demanded by the decastyle plan. But the point is this: such a plan would demand an exceedingly expensive roof, and the case of Miletus proves what the consequence might be; the limitation of funds, alas! imposes on an architect as absolute a need to contract his aspirations as any difficulty of construction.

As regards Greek knowledge of the truss, there seems fair reason for carrying it up at least as high as Homer. Thus much may be deduced from a simile which does not remind one more of the pairs of wrestlers on the vases leaning forward upon each other in strict embrace, than of the lines and bearings of a trussed rafter roof. Achilles at the funeral of Patroclus proposes a prize for wrestling:—

"He said and then arose the great Telamonian Ajax;
And Ulysses many counselled, in stratagems well skilled, rose up;
And the pair having cinctured themselves went into the mid assembly;
And with their stalwart arms they took hold clasping each other,
Even as rafters might be which a workman renowned has fitted
For a lofty mansion, providing against the force of tempests.
Then creaked their very backs as they by their arms so stalwart
Were firmly and forcibly strained," &c.
(Literal translation.)

## OBITUARY.

*Mr. C. H. Cooke, F.R.I.B.A.*—Mr. Charles Henry Cooke, F.S.A., at one time a member of the Council of the Royal Institute of British Architects, died on the 15th inst., aged 58. He was for many years architect to the Royal National Lifeboat Institution. His death was alluded to at the last meeting of the Institute of Architects, as will be seen by our report on p. 206, of the present number.

*Mr. T. E. Harrison, M.Inst.C.E.*—Mr. Thomas Elliot Harrison, Engineer-in-Chief of the North-Eastern Railway Company, and who was President of the Institution of Civil Engineers in 1874, died very suddenly at his residence, Whitburn, near Sunderland, on Tuesday last. He was born on the 4th of April, 1808, and was consequently within a few days of completing his 80th year. Conjointly with Robert Stephenson, he was engineer for the construction of the Newcastle and Berwick and the Newcastle and Darlington lines, and he shares with Stephenson the credit of designing and building the High Level Bridge across the Tyne from Newcastle to Gateshead. The *Newcastle Chronicle* of Wednesday gives an interesting memoir of his life and work. One of his brothers is Mr. John Thornhill Harrison, one of the Engineering staff of the Local Government Board.

**Association of Public Sanitary Inspectors.**—At the last meeting of this Association, Mr. S. Fairchild, Sanitary Inspector for Clapham, chose for his subject "Bad Plumbing." Mr. Alexander, the Chairman of the Council, presided, and there was a good attendance of members. Starting from the public fact that in 1886 there were in England and Wales 9,159 deaths from diphtheria and typhoid, the lecturer maintained that the majority of those deaths could have been prevented by good sanitary arrangements, of which good plumbing was one of the most essential parts. Proceeding to treat of sanitary appliances in detail, he said the traps in use were legion, but very many were bad, a majority indifferent, and comparatively few good. A good trap should have the following characteristics:—(*a*) Ability to resist the acids contained in sewage; (*b*) It should be self-cleansing, round in section, and on the syphon principle; (*c*) It should be sufficiently sealed to resist sudden extra pressures either from within or without; (*d*) The quantity of water used for sealing should be the smallest possible; (*e*) Its form should readily permit of internal inspection; (*f*) It should be ventilating; and (*g*) It should permit of the easy detection of any flaw in the manufacture. A discussion followed.

**New Railway Station, Hertford.**—We are asked to mention that the roof over the new station at Hertford, for the Great Eastern Railway, which was recently opened for traffic, is glazed on Rendle's patent "Invincible" system, the area being nearly 5,000 feet superficial.

*The Great Arch of Tak-y-Kesra, at Ctesiphon.—From a Drawing by M. Texier.*

## MAHOMETAN ARCHITECTURE.

SIR,—In the paper I read before the Architectural Association on "Mahometan Architecture" [see *Builder*, pp. 103, 119, *ante*], I referred to the tomb of Zobeide, near Bagdad, as illustrating, in the construction of its dome, what appeared to me to be the origin of the stalactite vault. I stated, however, that I had no accurate information respecting its construction. I have since learnt from persons who have seen the tomb that the whole of the vault covering it is built in brick, forming small niches on the inside, which correspond to the peculiar miniature domes outside. This, I think, may be taken as fair evidence that the origin of this peculiar type of construction must be looked for in the brick buildings of Persia, and not in the stone construction of Egypt or Syria, as advanced by De Vogüé and Prisse d'Avennes. Zobeide was the favourite wife of Haroun-el-Rasheed, who reigned from 786-809 A.D. This tomb dates, therefore, probably from the end of the eighth century, viz., nearly four centuries before the earliest example to be found in stone in Egypt.

Searching through the unpublished drawings of Texier's at the Institute for further data respecting this tomb of Zobeide, I came upon an important drawing of Texier's which seems to have escaped attention. In Fergusson's history a drawing is given of the Great Arch of Tak-y-Kesra, at Ctesiphon, which is shown there to be of elliptical form, the longer axis being vertical. Fergusson in alluding to its form says, "Instead of the plain circular arch of the earlier example the architect has here attempted the section of one of his domes, hoping thus to avoid some, at least, of the lateral thrust; to obtain, in short, by an ellipse what the Gothic architects managed by the pointed arch. As a more scientific point of construction, it is not clear the Sassanian did not take the best mode of attaining his end, but to our eyes, at least, it appears fortunate that the Gothic architects had other models before them, or they might have copied what, perhaps, even their ability would never have rendered a beauty." I confess I have always been somewhat sceptical as to the elliptic form given in Fergusson's drawing and also as to his theory respecting its section having been taken from a dome, for evidently the form which might be good construction in a dome, in a barrel-vault no longer possesses the same nature of thrust. Now, Texier's drawing (of which the accompanying is a reduced copy) not only shows the vault to have been an ordinary pointed barrel-vault, but continues the outer order of the great arch down to the springing of the arch,—a much more natural form than that shown in Fergusson. The seventeen small arches to which Fergusson alludes as being foiled round the great arch would be twenty-five in number, only six are destroyed. This feature is to be found in other buildings in Central Syria, and notably round the chancel arch of Qalb-Loozeh. Fergusson's drawing is apparently taken from the engraving in Flandrin and Coste's "Persia": an engraving probably made from a sketch only, and possibly, therefore, not so reliable as Texier's original sketch.

If my surmise be correct, this sketch of Texier's proves the antiquity of the pointed barrel-vault (at all events, above ground, for there is a pointed vault to the drain beneath the south-east Palace of Nimroud) to be much earlier than one supposed, for this great arch at Ctesiphon (72 ft. wide, 85 ft. high, and 115 ft. deep), dates from 550 A.D.; it precedes the pointed arches in the Mecca wall of Amrou, Old Cairo (about the age of which, however, there is some doubt) by a century; the pointed arches of Ibn-Touloun by more than three centuries; and the pointed barrel-vaults of Sultan Hassan, 1356 A.D. (69 ft. wide, 90 ft. high, and 90 ft. deep) by no less than eight centuries.

R. PHENÉ SPIERS.

## PROGRESS OF THE NEW WIMBLEDON AND WEST END RAILWAY.

NOTWITHSTANDING the unfavourable state of the weather during the last few months, and the recent prolonged frost, the works on the new railway which is to connect the West End with the main line of the London and South-Western Railway at Wimbledon, and which were commenced in March last, are making rapid progress, being so far advanced towards completion that the opening of the line for traffic is expected to take place early in the coming summer. That portion of the line from its commencement at Wimbledon to the Upper Richmond-road, Putney, is so nearly finished that the ballasting is now progressing. This section on leaving Wimbledon Station runs parallel with the main line as far as Gap-road Bridge, when it branches off through Wimbledon Park, and from this point it is carried on an embankment to Melrose-road, whence it runs through a short cutting, and then enters a tunnel which runs under Sutherland-road, and also under Kingston-road. This tunnel is 120 yards in length. Emerging from the tunnel an open cutting brings the line to Upper Richmond-road, which is crossed over by an iron girder bridge. Some of the heaviest portion of the work lies between this point and the final junction of the line with the Putney Bridge Station, at Fulham, of the Metropolitan District line, which connects the new railway with South Kensington. These works include several viaducts in addition to the bridge across the Thames. From the Upper Richmond-road the railway is carried on a brick viaduct of upwards of twenty arches, and 620 yards in length, crossing over the Company's Windsor line near Putney, and in continuation, by a falling gradient of one in seventy to the south bank of the Thames, where the river is to be crossed by a trellis girder bridge which was designed by the late Mr. Jacomb, the company's engineer-in-chief. The bridge will be supported by fourteen cast-iron cylinders, each 10 ft. in diameter, and by two rusticated granite and Portland stone abutments. The bridge has six spans, the first two on the south side being 100 ft. each, the three centre spans 153 ft. each, and the last span on the north side 100 ft. There will be a footway on the east side of the bridge for the convenience of the public. All the cylinders have been sunk, and the abutments, permanent way, and trellis girders of the bridge are in a forward state. The undertaking also includes a branch connecting Wandsworth with Wimbledon, which did not form part of the original project. This branch leaves the line from Wimbledon a short distance before its arrival at Upper Richmond-road, and is carried across that thoroughfare, some distance to the east of the principal line, on a girder bridge, thence on a viaduct of several arches, crossing over the Company's Windsor line, and thence, proceeding in a south-easterly direction by a circular curve, and on a descending gradient, falls into the Windsor line on the level, about midway between the Wandsworth and Putney stations. This branch will place Wandsworth in direct communication with the main line at Wimbledon. At present, to effect that, a circuitous route has to be made *viâ* Clapham Junction, where a change of carriages is necessary. Messrs. Lucas & Aird are the contractors for the works.

## Illustrations.

### WEST FRONT, WELLS CATHEDRAL.

THE illustration of the west front of Wells is from a drawing by Mr. Arnold B. Mitchell. This façade, one of the most remarkable pieces of architectural poetry in existence, has been often illustrated, but many of our readers will value this reproduction of a drawing with a great deal of characteristic style and effect in it.

### MEMORIAL BRASSES IN HERTFORDSHIRE CHURCHES.

WE illustrate this week brasses in three of the churches of Hertfordshire, from rubbings taken in 1886, by Mr. William F. Andrews, of Hertford, who possesses a collection of rubbings of the whole of the brasses now remaining in the churches of that county, and who has published a detailed description of them, from which the following notes are taken:—

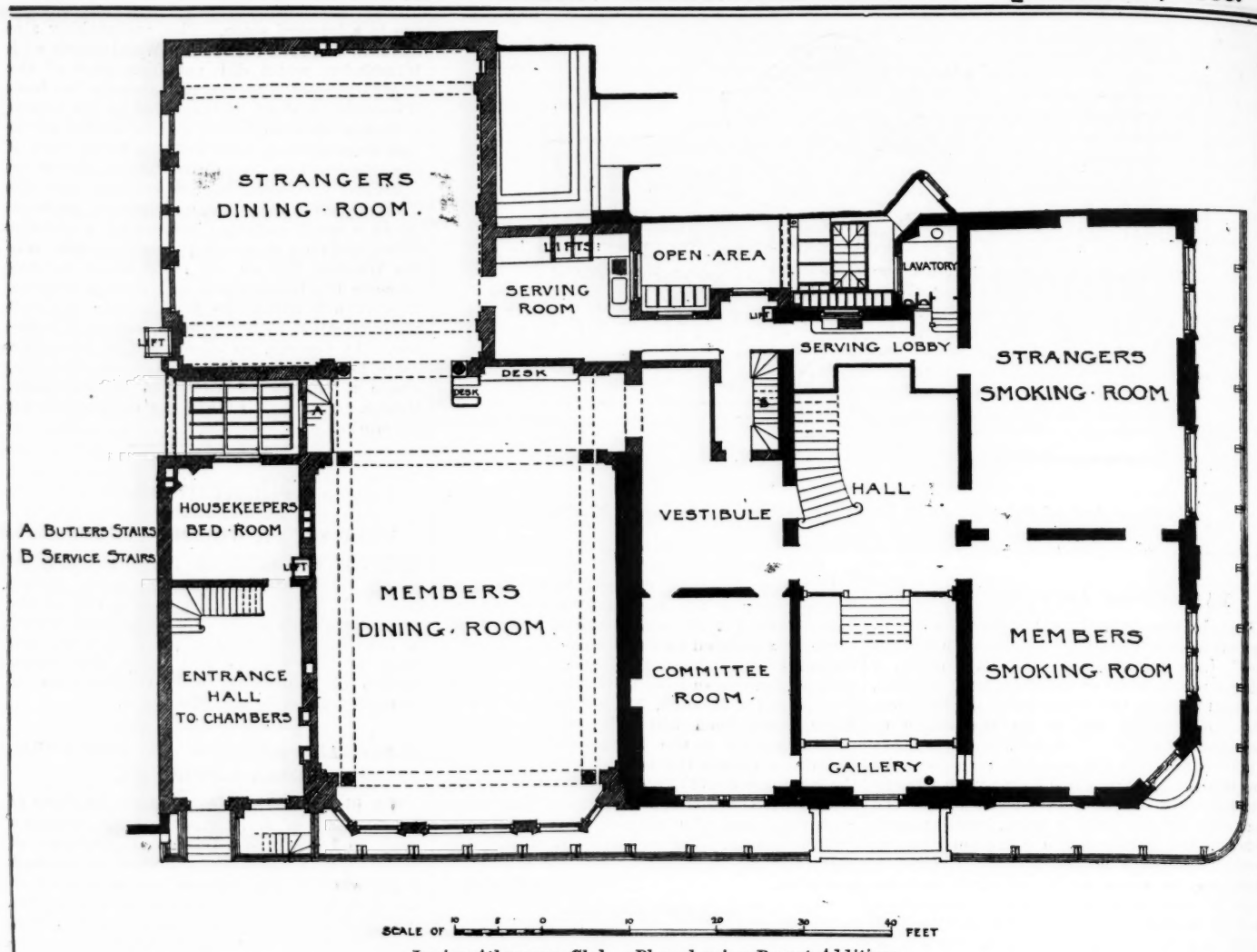
#### ALDBURY.

Man, wife, children, and four shields. These brasses represent Sir Ralph Verney and Elizabeth his wife, and their nine sons and three daughters. They are fixed upon an altar-tomb, and are in a good state of preservation. On the sides of the tomb were originally six shields, which, with the inscriptions, are missing. Sir Ralph is represented as being in a complete suit of armour, with his head resting upon a helmet, and his arms are engraved on his tabard. The lady is dressed in a long robe, with a mantle elaborately emblazoned with the arms of Whittingham, and also of her father, Edmund Lord Bray, and the mantle is fastened at her neck by a cord reaching to her feet with two tassels; her head-dress is plain, and has long strings behind. The nine boys are all dressed alike in plain robes, and are all shown of the same height, instead of the usual plan of graduating from large to small. The three girls are also plainly dressed. The four shields all bear in various forms the quarterings of Verney and Bray. Haines gives the date 1546-7, and Clutterbuck, in his History of Herts, has a good engraving of the brasses.

The family of Verney held the Manor of Pendley in this parish, and lived at the Manor-house.

#### HINXWORTH.

*On Floor of Nave.*—Man, wife, children, shields, and scrolls. The man is dressed in the robes of an alderman, elaborately trimmed with fur; he has a girdle fastened round the waist by a buckle, from which is suspended a gypcière and a rosary; his hair is cut short. The brass of this figure, and also that of the lady, is remarkably well preserved. The lady wears a plain dress trimmed with fur, with an ornamented girdle suspended from her waist; her neck is bare; her waist is small, and her arms are particularly slender, with fur cuffs on her hands; her hair is brushed off her forehead, and she wears a wired or butterfly head-dress similar to Lady Say on a brass in Broxbourne Church. At the feet of the figure of the man are small figures of four sons, three of whom are of nearly equal size and similar costume, and one of them wears a gypcière; the other son is shown of a larger size, and is dressed in the robes of a priest; probably he was the eldest son. Under the feet of the lady is a




*Junior Athenæum Club.—Plan showing Recent Additions.*

small figure of a girl with long hair hanging down her back below her waist, and dressed similarly to her mother, and also a larger figure of a female, probably the eldest daughter, who wears a dress trimmed with fur, laced up the front; she also has cuffs, and wears a necklace and a peculiar head-dress with cap. From the mouth of the figure of the man proceeds a scroll, inscribed—"In [Manus tuus Domine] commendo Spm̄ meū et c' &," and from that of the lady inscribed "Credo videre bona dm̄ in terra Viventium." Above the figures are three shields, one of which bears the arms of Saint Alban, another one is much worn and undistinguishable, and the middle one has upon it the arms of the Mercers' Company. At the bottom are also three shields bearing arms, probably of the man and his wife, and the middle one has the trade mark of a merchant. The inscription is gone, but is given by Chauncy as—

> "Orate pro animabus Johannis Lambard Civis & Mercери ac
> Aldermanni London qui obiit 1487 & Annæ uxoris suæ que obiit ——
> Quorum Anime per misericordiam Dei in pace eterna requiescant. Amen."

John Lambard was owner of the manor of Pulters, and Chauncy states he was master of the Mercers' Company of London, and one of the aldermen of that city.

PELHAM (FURNEAUX).

*In Chapel.*—Man, wife, and double canopy. The male figure is placed on the left hand of his wife instead of, as usual, on the right side. He wears the dress of a civilian; his robe is trimmed with fur and fastened at the waist by a girdle, from which hangs a short sword; his hair is short, and he has a moustache and pointed beard; his shoes are pointed, and his feet are resting upon a dog. The costume seems to be of the reign of Richard II. The lady is plainly dressed as a widow, and has a ring on one of her fingers. The canopy is partly gone, and is a double one, enriched with crockets and pinnacles. There was originally an inscription and one daughter and four shields, all of which are missing. Haines says perhaps the figures represent John Barloe, who died 1420, and his wife Joan, who died 1419, according to an inscription given by Chauncy, but this seems doubtful, as the lady is dressed as a widow. Cussans states that the figures are habited in the costume of Richard II., and probably they represent Sir John de la Lee, who died 1370, and Johanna his wife.

This John de la Lee was Member of Parliament for the county of Hertford in 1355.

## FOUNTAIN COURT, HAMPTON COURT PALACE.

THE illustrations here given of this Court, which is the most pleasant bit of the external architecture of Wren's portion of Hampton Court Palace, are from measured drawings by Mr. P. L. Marks.

## JUNIOR ATHENÆUM CLUB.

HOPE HOUSE, situated at the corner of Down-street, Piccadilly, and for many years the home of this Club, was erected nearly forty years ago for the late Mr. Thomas Hope by Professor Donaldson, in conjunction with M. Dusillion, of Paris. It was purchased by the Junior Athenæum Club for the purposes of a club-house, and continued as such until it became necessary to extend the accommodation. With this object a site of three houses in Down-street was acquired, on which, together with that of the stabling at the rear belonging to the house, the new buildings, shown in the plan by hatched lines, were erected. They comprise new dining-rooms, kitchen, still-room, offices, lavatories, and cloak-room, with the addition of bath and dressing rooms.

The walls of the grand staircase, from the level of the dining-floor to the top, have been lined with Portuguese marble, the decorative features of the original design being retained as far as possible.

The upper part of the new building fronting to Down-street, and comprising about thirty rooms, is laid out in suites of chambers, let to the members of the club, this portion of the building being entirely constructed with concrete floors and partitions, having all the requisite offices and a separate entrance from Down-street.

The new buildings have been designed to harmonise as far as possible with the older part of the structure.

The works have been executed from the designs and under the superintendence of Mr. Alfred Williams and Mr. C. W. Stephens. The contractors were Messrs. Patman & Fotheringham, Mr. Stimson being clerk of the works.

The drawing from which the illustration is taken was exhibited in last year's Royal Academy exhibition.

## BOULTER'S LOCK HOTEL, MAIDENHEAD COURT.

THE site for this proposed building is immediately opposite the woods of Cliveden, in one of the most charming reaches of the Thames. It is proposed to be situated on the Maidenhead side of Boulter's Lock, and thus avoid the crushing on Saturdays and Sundays, and a boat-house will be used in connexion with it.

It is proposed to be erected in red brick with stone dressings, the upper portions being relieved with rough-cast and half-timber construction, and the roof will be covered with Broseley tiles. A feature will be the long line of balconies on the upper floors, as shown on the illustration.

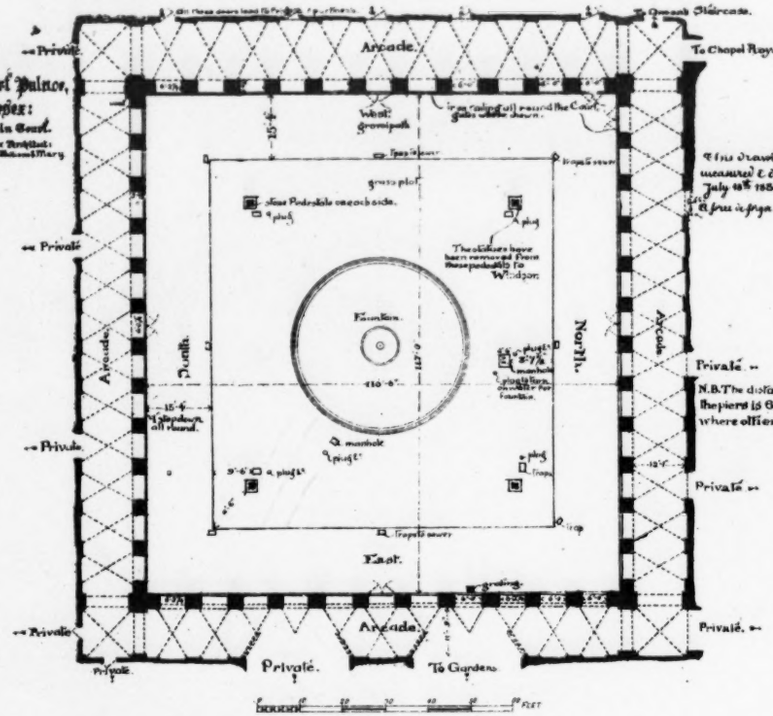
The architect is Mr. T. S. Archer.

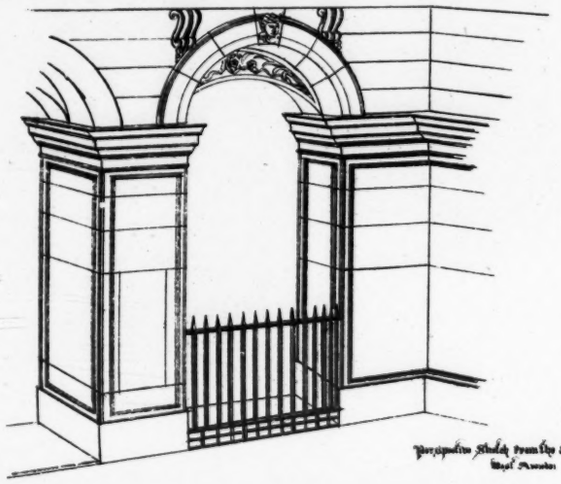
**Drawings for the Royal Academy.**—It is necessary to remind those who are sending drawings from the country to us to be delivered at the Academy, that the Royal Academy require a label with the title of the work and the author's name and address fixed to the back of the frame; a label containing the same information hung to the frame by a string; and a letter to the Secretary giving also the titles and number of works sent, with the author's address. Unless drawings are sent in accordance with these regulations, we cannot deliver them.

**Clocks.**—A large clock has just been fixed in Stambourne Church, Essex, by Messrs. John Smith & Sons, of the Midland Clock Works, Derby. It strikes the hours upon a large bell, and shows the time upon a 4-ft. dial. The same makers have also just erected a large clock at Sydney Park, Gloucestershire, for Mr. Charles Bathurst.

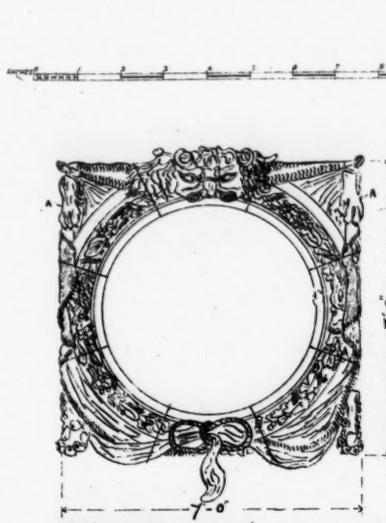
PHOTO-LITHO SPRAGUE & Co. 48 MARTINS LANE, CANNON ST. LONDON E.C.

Hampton Court Palace, Middlesex:
Plan of Fountain Court.
Sir C. Wren Architect:
temp. Wm. and Mary.

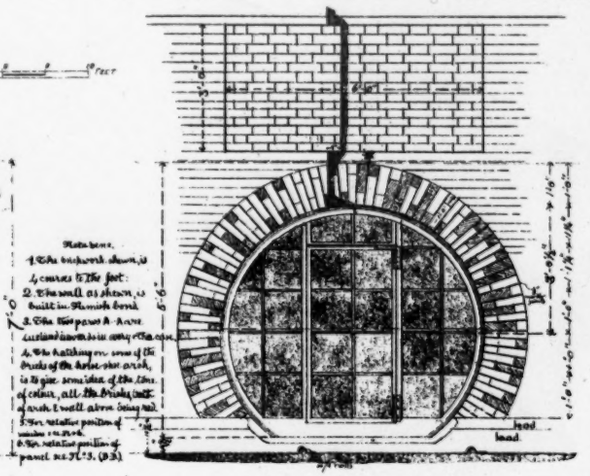


Perspective Sketch from the Gallery over the West Arcade.



Detail of Framework to circular windows & to the "Labours of Hercules".



Detail of upper window to Ante room between the Kings & the Mantegna Galleries, as seen from the lead flat over the west Arcade.

Hampton Court Palace: Fountain Court:
Details of piers & Arches:

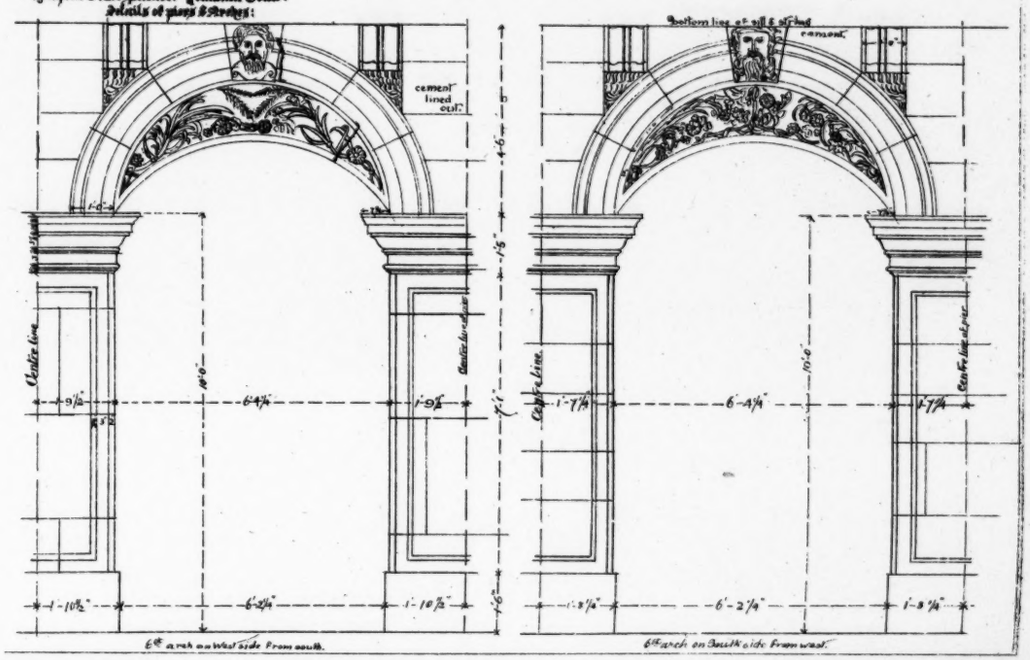
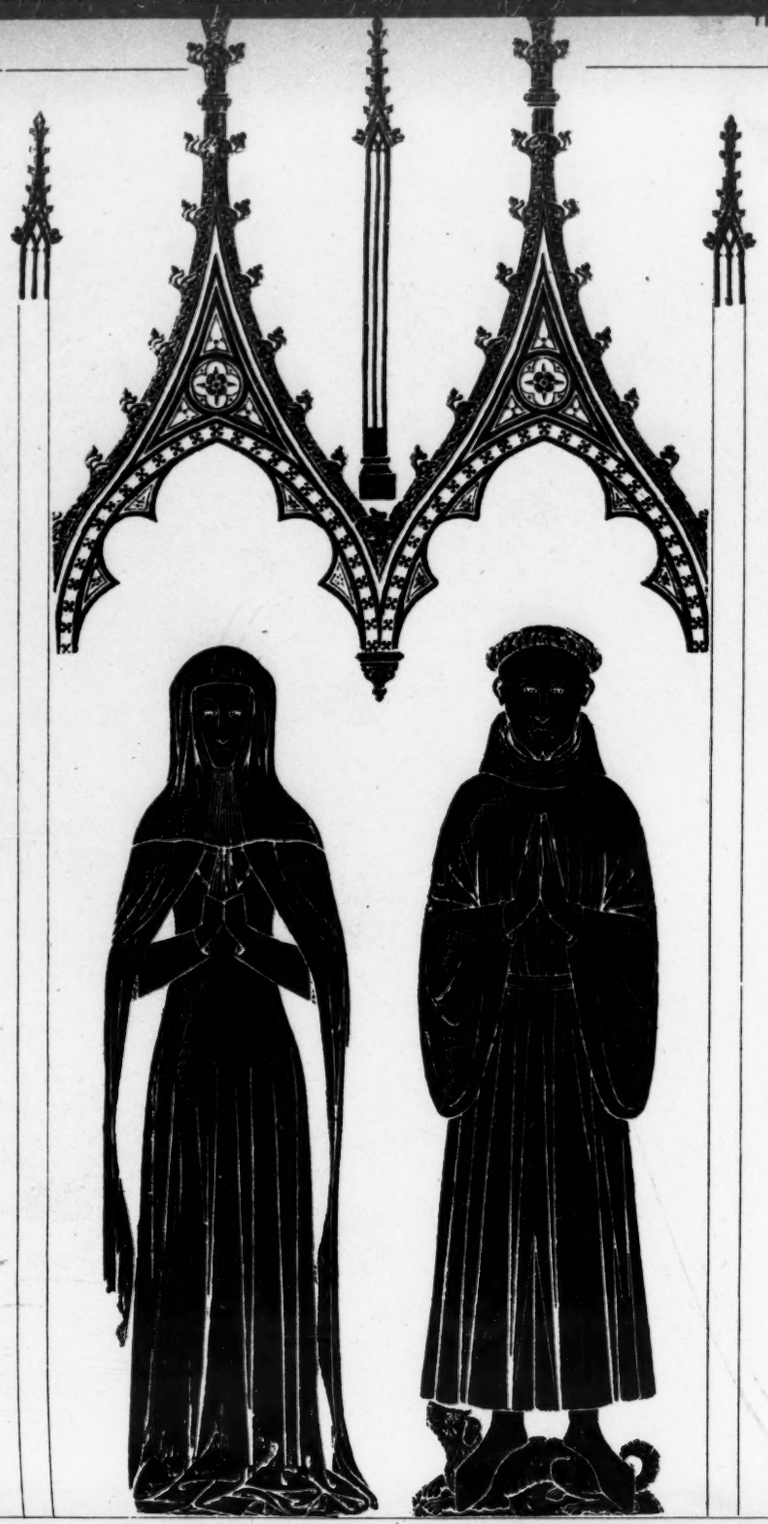



PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

THE "FOUNTAIN COURT," HAMPTON COURT PALACE.—Drawn by Mr. P. L. Marks.

THE "FOUNTAIN COURT," HAMPTON COURT PALACE.—Drawn by Mr. P. L. Marks.



IN MEMORY OF SIR JOHN DE LA LEE AND JOHANNA, HIS WIFE. (1370.)—PELHAM (FURNEAUX) CHURCH.

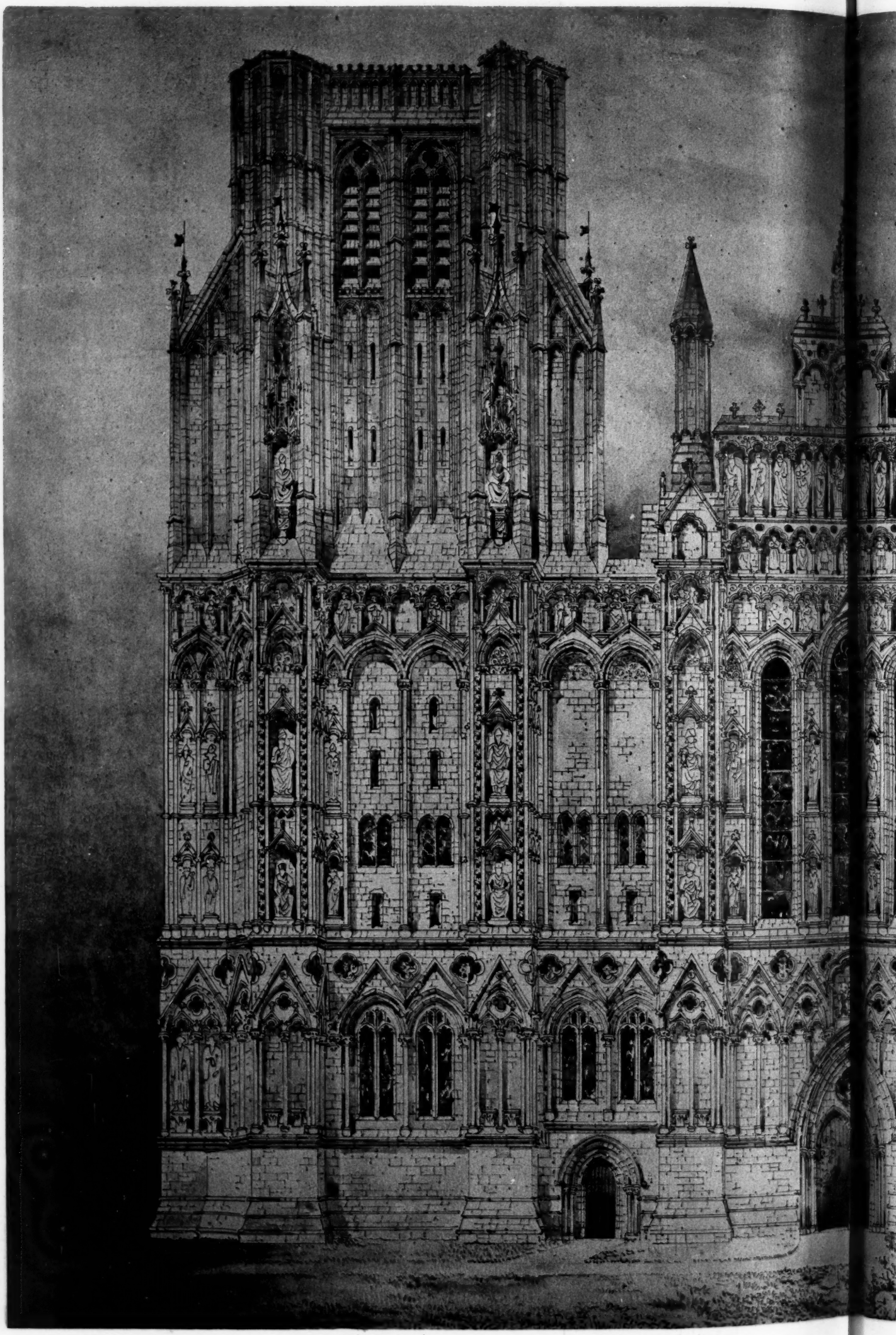
IN MEMORY OF SIR RALPH VERNEY AND ELIZABETH, HIS WIFE. (1547.)—ALDBURY CHURCH.

PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

MEMORIAL BRASSES IN HERTFORDSHIRE CHURCHES.

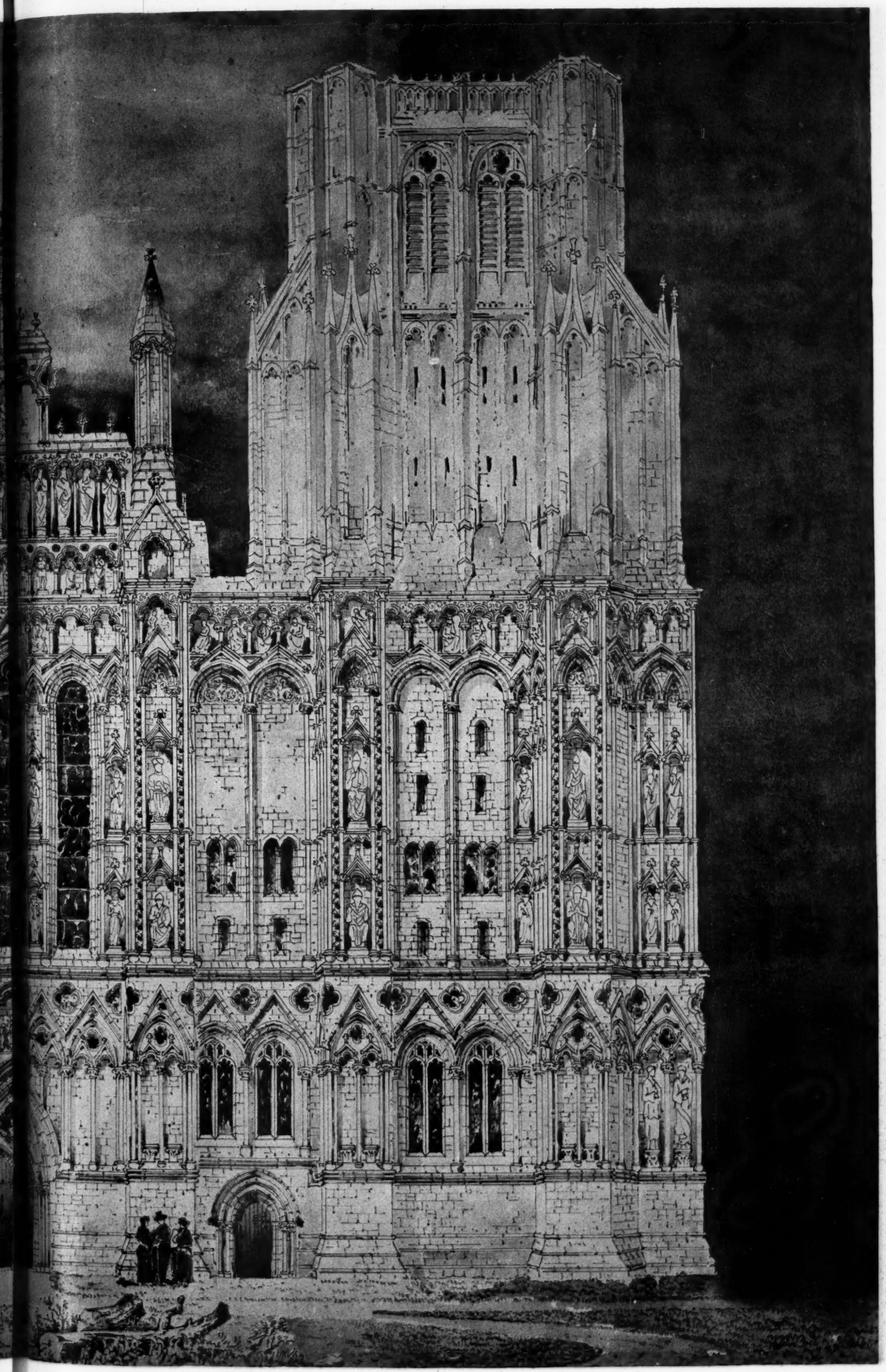
IN MEMORY OF SIR JOHN DE LA LEE AND JOHANNA, HIS WIFE. (1370.)—PELHAM (FURNEAUX) CHURCH.

IN MEMORY OF SIR RALPH VERNEY AND ELIZABETH, HIS WIFE. (1547.)—ALDBURY CHURCH.



S. B. BOLAS & CO., PHOTO-PRINTERS,

WEST FRONT, WELLS CATHEDRAL.



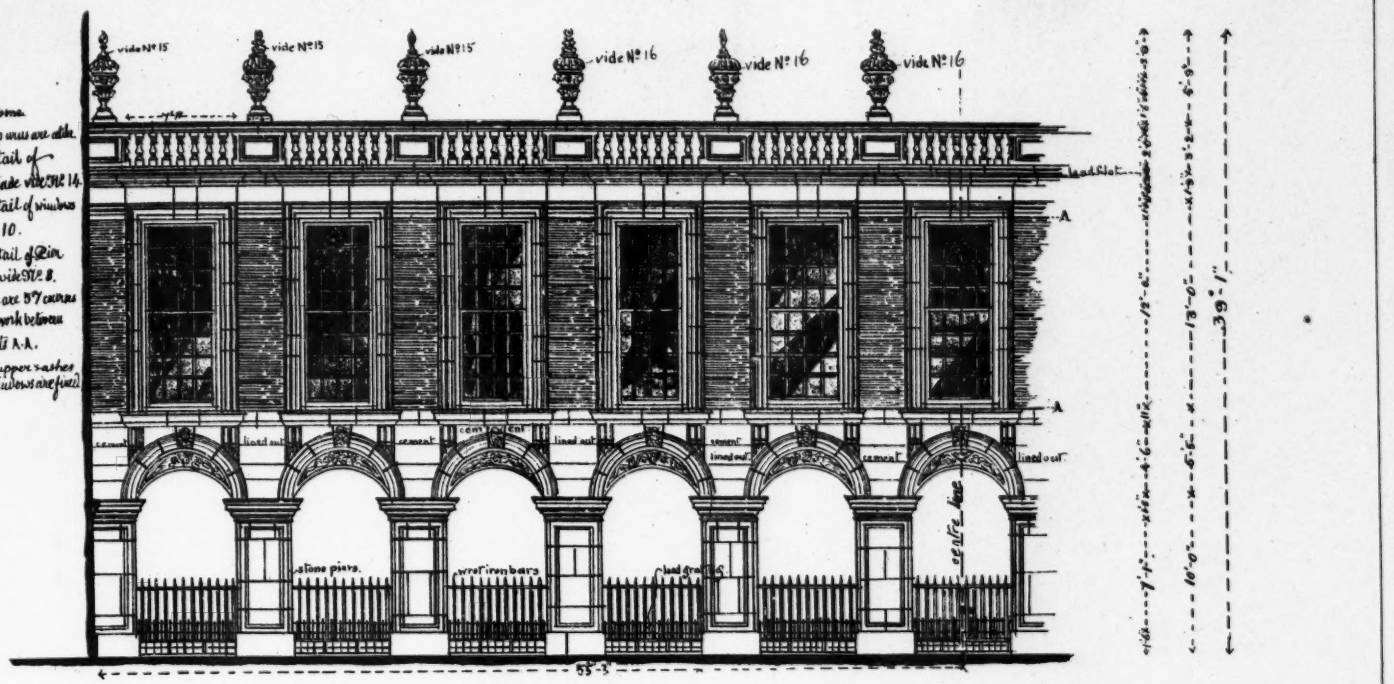
11. LUDGATE HILL, E.C.

DRAWING BY MR. ARNOLD B. MITCHELL.

PHOTO-LITH O. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

IN MEMORY OF JOHN LAMBARD AND ANNE, HIS WIFE.—HINXWORTH CHURCH.

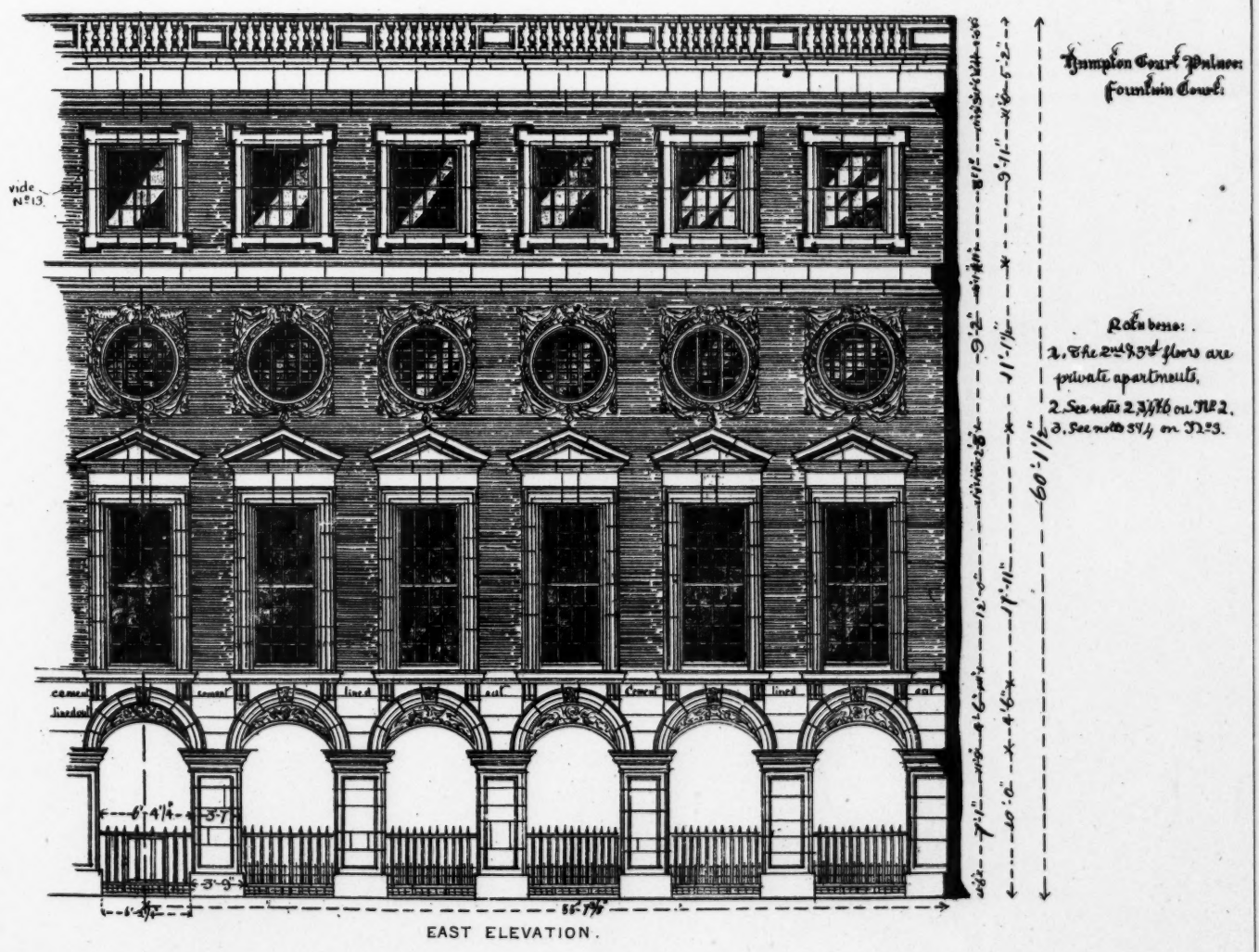
## MEMORIAL BRASSES IN HERTFORDSHIRE CHURCHES.




WEST ELEVATION.

Notes here.
1. No two arms are alike.
2. For detail of balustrade vide N° 14.
3. For detail of windows see N° 10.
4. For detail of Iron Screen vide N° 8.
5. There are 57 courses of brickwork between the points A-A.
6. The upper sashes of the windows are fixed.

1 5 10 15 20 25 FEET




EAST ELEVATION.

Hampton Court Palace:
Fountain Court.

Notes here:
1. The 2nd & 3rd floors are private apartments.
2. See note 2 & 6 on N° 2.
3. See note 3 & 4 on N° 3.

PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

THE "FOUNTAIN COURT," HAMPTON COURT PALACE.—Drawn by Mr. P. L. Marks.

GROUND · PLAN.

PHOTO-LITHO SPRAGUE & Co. 28, MARTINS LANE, CANNON ST. LONDON, E.C.

PROPOSED HOTEL NEAR BOULTER'S LOCK, MAIDENHEAD.—Mr. T. S. Archer, F.R.I.B.A., Architect.

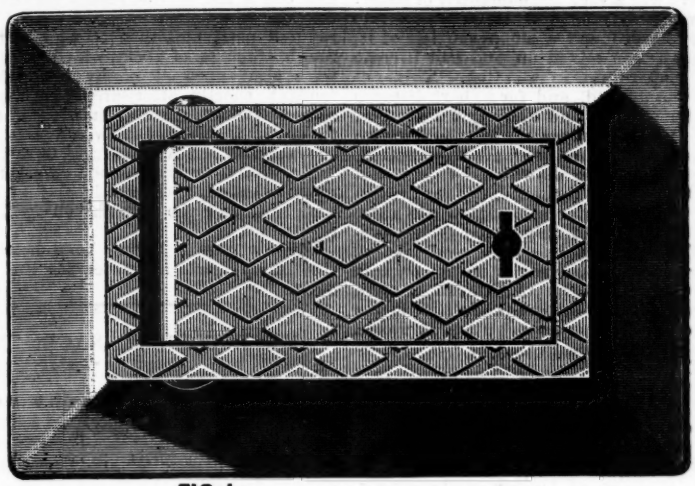


FIG. 1.

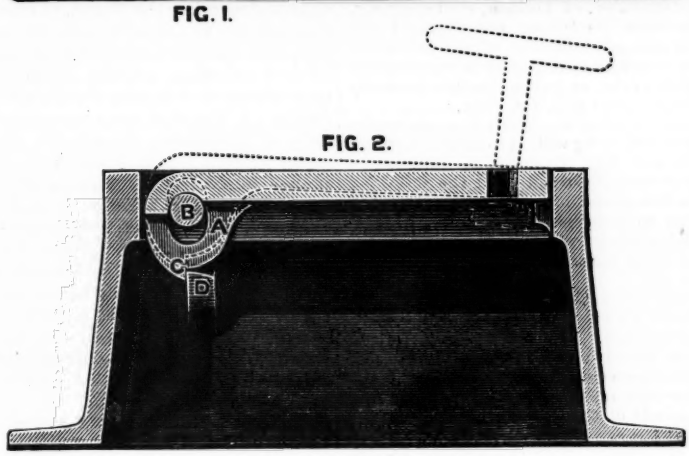



FIG. 2.

*A New Street Surface-Box.*

## A NEW STREET SURFACE-BOX.

THE accidental and in some cases wilful opening of surface-boxes has been a fruitful source of danger to pedestrians, and has suggested the idea of the patented invention here illustrated.

Fig. 1 shows the apparatus in plan, and fig. 2 is a longitudinal section.

The design reminds one somewhat of those puzzle-boxes, at one time so popular, which had to be turned upside down and shaken before they could be opened. In the same way, before the lid of this surface-box can be lifted, it is necessary to tilt the hinge end of the lid slightly by means of the key, so as to allow the point of the cam C to pass clear above the internal lug D, which, when the lid is closed and in its normal position, acts as a stop to prevent the lid from opening.

The device, it will be seen, is extremely simple, as its action all depends upon the hinge-pin B passing through a slot instead of a round hole. The slot is of sufficient length to admit of C passing over D to the position shown by the dotted line A, as before explained. It is apparent that as the lid falls into its place again it locks itself automatically, and thus obviates the chance of a careless turn-cock endangering the public safety by leaving it unsecured.

Messrs. Glenfield & Co., of Kilmarnock, are the manufacturers.

## SANITARY CONDITION OF COVENTRY IN 1887.

THE thirteenth annual Health Report, just presented to the Mayor and members of the Coventry City Council, contains evidence of the general and progressive improvement in the sanitary condition of this old city.

There has been a reduction in the rate of mortality, and a decrease in the amount of zymotic sickness; whilst an increase of the population, and a considerable extension in the construction of dwelling-houses, factories, and of new streets is recorded; the plans passed, and the number of buildings erected there, being far in excess of that in any previous year.

The report, from which we quote, states that "In the general construction, the mode of drainage, and materials used, there is a considerable improvement, but the system of allowing the houses to be occupied when scarcely completed, and before they are fit for habitation, still prevails." Referring to an outbreak of typhoid fever, from which four deaths were registered, the Medical Officer of Health (Dr. Fenton) thus describes the insanitary condition of some of the courts in the city:—"The conditions in these courts are bad as regards ventilation, paving, and drainage. The dwellings are of that Mediæval description for which Coventry is so celebrated; exceedingly picturesque, but so constructed as to effectually prevent the introduction of fresh air or light, while they are crowded together, often leaving but a few feet of air space between the opposing rows."

Unfortunately, such dwelling-houses as those above described are far too numerous in the city, and although improvements have been effected therein, yet many of the houses appear to be so old and ruinous as to require constant attention to keep or maintain them in habitable condition; indeed, it may be said that no lasting improvement could be effected in such neighbourhoods unless some general scheme of demolition were first put into operation.

A concise statement of the several matters reported on and dealt with by the Sanitary Inspector (Mr. Frederic Booker) is given, from which we observe that the general inspection of the district and the removal of nuisances have been systematically and zealously attended to, and many sanitary improvements have been effected during the past year.

Indeed, the beneficial effects of the Public Health and Sanitary Acts, where efficiently administered, is becoming more apparent from year to year in the reduction in the amount of sickness and in the decrease in the rate of mortality, and the city of Coventry has certainly been well to the front in this respect; for, whilst the average rate of mortality during the past year in twenty-five large towns was 20·8, in Coventry, with an estimated population of 47,750, the rate of mortality was only 16·3 per thousand, this latter result being very satisfactory, considering the unwholesome fashion in which a great proportion of the houses and streets have previously been constructed.

**"Cire perdue."**—Messrs. Singer wish us to say that the grammatical error of "cire perdu" in their circular note about the process, to which we referred the other day in mentioning their new castings, was merely a clerk's error, and not chargeable on the members of the firm.

## BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

### ANNUAL DINNER.

THE tenth annual dinner in aid of the funds of this excellent Institution, which has now been established for twenty-one years, took place in the Venetian Saloon of the Holborn Restaurant on Tuesday evening last, when Mr. J. W. Hobbs, Mayor of Croydon, President of the Institution, occupied the chair, supported by members and friends of the Institution to the number of 279 in all.

The usual loyal and patriotic toasts were duly honoured, the Chairman, in proposing "The Prince and Princess of Wales," &c., remarking that the Prince was one of the hardest-worked men of the day, and resembled a builder in a good way of business, having "jobs all over the country" (laughter). Mr. James Hill, in a humorous speech, proposed "The Army, Navy, and Auxiliary Forces," coupled with the name of Captain Dibley of the Militia.

The Chairman, in proposing the toast of the evening, "The Builders' Clerks' Benevolent Institution," referred to the excellent work which the Institution has done and is doing in alleviating the sorrows and distresses of old or infirm builders' clerks, their widows and orphans. He strongly urged the necessity of every builder's clerk making some provision for the future, and one of the best ways in which he could make such provision was by joining the Institution. Possibly, and most probably, all the members would not need relief from its funds, but they would have the satisfaction of being able to do something to assuage the lot of their less fortunate comrades in the battle of life. He trusted that every builder's clerk would let his office associates have no peace until they enrolled themselves as members of the Institution, and he only wished his words could result in every builder's clerk in the country sending up his name as a member. The builder's trade was often one of great and striking vicissitudes. He could recall some firms of long and honourable standing who, through the keenness of competition and various unforeseen causes, had been compelled to close their establishments. He was sure that nothing could be more painful to the members of such firms at such times than to see the able men who formed their staffs, and who had served them faithfully for perhaps very many years, all turned upon the world to seek their livelihood elsewhere. To be a successful builder a man must be many masters. He must be master of the bricklayer as well as master of, or at any rate a match for, the architects and surveyors (laughter), and, what was perhaps of more importance still, he must be master of the lawyers (laughter). But in all his trials and difficulties, the builder could always count upon the faithful and intelligent service of his clerks. He therefore appealed to the master builders and the visitors to do all they could to aid the builders' clerks to help themselves. He found that at the previous dinners which had been held the large sum of 2,706*l.* in all had been subscribed, and he trusted that that evening they would be able to make up the amount of 3,000*l.* (cheers). Incidentally, Mr. Hobbs provoked applause and laughter by referring to the new Local Government Bill, a measure which was, he hoped, destined to sweep away the authority which had so long, and with so many inconsistencies, controlled building matters in London (hear, hear).

The toast was very enthusiastically received.

Mr. George Burt, jun. (John Mowlem & Co.) proposed "The Architects and Surveyors," coupled with the names of Mr. John Slater, B.A. (President of the Architectural Association), and Mr. L. C. Riddett. Mr. Slater, in reply, remarked that the skilful plans and the fertile fancy of a Burges or a Street required the organising and constructive resources of the builder for their realisation. Mr. Riddett, in a humorous speech, referred to the troubles and trials of a quantity surveyor, whose only *solatium*, after sitting over a set of plans for three or four weeks, was two and a half per cent. He referred to builders' clerks as a class *sui generis*. The ideal clerk was Tim Linkinwater, who dotted his i's and crossed his t's as he made them. The builders' clerk did not always do that, but he was necessarily a many-sided man. In the morning he might have to deal with an obstreperous navvy, and perhaps

in the afternoon he would have to call upon a fastidious architect (laughter).

Mr. G. C. Kentish proposed "The Builders," coupled with the name of Mr. W. R. Freeman (John Mowlem & Co.), who briefly replied.

The other toasts were, "The Merchants" (proposed in a characteristic speech by Mr. E. C. Roe, and replied to by Mr. T. W. Dobson); "The Past Presidents" (proposed by Mr. Edwin Brooks, treasurer, and responded to by Mr. W. R. Freeman); "The President" (proposed by Mr. W. R. Freeman); "The Visitors" (proposed by Mr. W. E. Stoner and replied to by Mr. Lacy W. Ridge, F.S.A.); and "The Secretary" (proposed by Mr. Kentish).

During the evening, subscriptions and donations to the amount of 268*l.* 6s. 6d. were announced, including 21*l.* from the Chairman, 10*l.* 10s. from Messrs. J. W. Hobbs & Co. (Limited); 10*l.* 10s. from Mr. Mitchell Henry; 15*l.* 15s. from Messrs. John Mowlem & Co.; and 10*l.* 10s. from Mr. W. R. Freeman, making a grand total collected at these annual dinners of 2,975*l.* 3s. 1d. It was stated that other donations had yet to come in which would bring the grand total up to 3,000*l.*, or an average of 300*l.* per year (applause).

## ALLEGED NUISANCE AT THE STRATFORD-UPON-AVON SEWAGE FARM.

THOMPSON *v.* THE CORPORATION OF STRATFORD-ON-AVON.

THIS was an action brought against the Mayor, Aldermen, and Burgesses of Stratford-on-Avon by Councillor Thompson, who applied for an injunction to restrain the defendants from using their sewage farm so as to cause a nuisance, and claimed damages. It was tried on the 14th and 15th inst. at the Warwick Assizes, before Baron Huddleston and a special jury.

It appeared that the plaintiff, Mr. Wm. Thompson, an architect and surveyor, lived in the Evesham-rd., about 400 yards from the sewage farm. He bought the land on which his house was situated in 1871, and had lived there since the completion of the house. In 1881, at the time the defendants were thinking of buying land, he purchased about 11½ acres, near where the defendants afterwards fixed their sewage farm, the scheme for which was sanctioned by the Local Government Board in 1884 on the strength of assurances given that no nuisances would be caused by the farm. In 1885 the farm had been laid out, and it was alleged that very soon after the pumping of the sewage on to the land began, there arose a very offensive smell, which continued to the present time, pervading the plaintiff's house. According to the counsel, "a more stinking smell, or a more smelling stink, could not be imagined." It was especially bad during the prevalence of southerly or westerly winds. The plaintiff had complained from time to time, and the Corporation had promised to remedy the evil, but nothing had been done beyond the provision of what was called a "screening tank," in order to arrest the more solid portions of the sewage. This tank, it was asserted, was only emptied once in fourteen days, and greatly intensified the nuisance. Plaintiff did not ask for heavy damages,—only sufficient to cover his costs.

Among the witnesses called for the plaintiff was Prof. C. Meymott Tidy, chemist and analyst to the Home Office, who said he visited the sewage farm on Feb. 22 last, which was an extremely cold day. He found, practically, the ground doing no work at all. Black matter was over the whole farm. It was in a state of decomposition, and gave off exceedingly offensive smells. The tank was for the purpose of removing a certain quantity of the suspended matter of the sewage, the sewage being forced up from below through about 9 in. of a kind of practically non-porous slag. The suspended matter thus separated fell down into the tank, and was being removed at the time of his visit. It was being wheeled to a piece of land a short distance from the tank. He thought the substance that was being taken from the tank was the most offensive thing that he had ever seen in all his life. Asked what effect would be produced by the process going on at the tank, the witness replied "practically nothing." It would have no practical effect at all. There were three systems of sewage disposal. There was, first of all, broad irrigation; the second was what was called intermittent downward filtration; and the third was what was called precipitation. In this case it was perfectly certain the Corporation could do nothing with the sewage unless they precipitated it first. In answer to the judge, Dr. Tidy said he never saw a worse-conducted place. Continuing his evidence, the witness said there were two parts in the sewage,—first, the matters in suspension, and then the matters in solution. As regarded the matters in suspension, they formed a gelatinous coating over the surface of the ground, which prevented the water rushing through, and everything depended upon the effluent going through the ground,—proper irrigation. But in solution there was a very large quantity of paper. They all knew what a large quantity of paper came down, but they never found a single particle of it, because it had all been mixed up, and had become practically a paper-pulp in solution. This got deposited on the ground, and for a short distance underneath the surface, and they got a kind of papier-mâché of it, so that the sewage could not go through at all, and the ground gradually deteriorated, because paper was a thing on which the air would not act, and there it remained. The ground deteriorated, and the process adopted was most senseless in this case. The only action of the permanganate of soda which had been used was to excite the nitrites, but it did not act on the organic matter. Brewery refuse, he admitted, was more difficult to treat than ordinary sewage, and it was received at a higher temperature; but it was a mere question of the chemicals that were used in its treatment. The effect of hot water coming in promoted fermentation on the one hand, and increased the chance of effluvia being given off on the other. Asked how long he thought it would take to abate the nuisance, the witness said he should think they ought to be able to do it easily in a year.

Mr. Charles Hawksley, of London, civil engineer, in partnership with his father, corroborated the evidence as to the offensiveness of the farm, and said that there would be no difficulty in carrying out the precipitation works, as to the absolute necessity of which he fully agreed with Dr. Tidy.

At this stage an offer was made to compromise the case, the plaintiff being willing to accept payment of taxed costs and 100*l.* damages to cover extra costs. The case was adjourned until the following morning. In the meantime, the Council held a special meeting to consider the proposal, but resolved, by the casting vote of the Mayor (the numbers being eight for and eight against), to fight the case to the end.

At the meeting of the Court on the 15th inst., the plaintiff's counsel withdrew the offer of compromise, and the case proceeded.

The plaintiff having given evidence, and other witnesses having been heard on the same side,

The case for the defence was opened. It was admitted on behalf of the Corporation that change was desirable at the sewage farm, but it was urged in mitigation of damages that the plaintiff himself was a member of the Council at the time the present arrangements were decided upon, and voted for nearly every step that was taken in the matter. The sewage was previously sent into the river, where it would have to go again if the works were stopped.

Mr. Alfred Thomas Davis, Borough Surveyor of Stratford-on-Avon, deposed that up to the 27th of May, 1887, there had been no straining tank at the farm, and the sewage, just as it came down, was pumped on to the land. That had the effect of causing a film on the surface of the farm, which prevented the water getting into the land. After the construction of the straining-tank he found there was a decided improvement. (His lordship, addressing the examining counsel, inquired if this was decent after the evidence of Mr. Hawksley and Dr. Tidy that such a state of things had not been seen before. And it was not cross-examined upon. "I never saw anything worse," said Dr. Tidy. That was his experience on the 22nd of February.) Continuing his evidence, the witness said as far as he could he had taken steps to remedy the defects in the farm. Witness then gave some statistics respecting the building of houses in Stratford, with the view of showing that plaintiff's land was not likely to be in much request.

Other witnesses having been heard for the defence, the judge summed up the case, and the jury retired to consider their verdict. After an absence of forty minutes they returned into court, and after a few minutes' deliberation in the box they found damages from March, 1887, to September, 1887, for 1,000*l.*, and from July, 1885, to March, 1887, 250*l.*

His Lordship gave judgment for 1,000*l.*, saying the plaintiff might move to increase it by 250*l.* if he had the chance.

An injunction was granted, to be held over for twelve months, with liberty to apply. Plaintiff's counsel did not press for an absolute injunction.

## AN ARCHITECT'S CLAIM FOR PROFESSIONAL SERVICES.

BAKER *v.* ALLEN.

THIS was an action decided in the Colchester County Court on the 14th inst. It was brought by the plaintiff, Mr. T. H. Baker, architect, of Clacton-on-Sea, against Mr. J. C. Allen, a builder, formerly of Clacton-on-Sea, but now of Sevenoaks, Kent, to recover the sum of 4*l.* 4s. 6d., the balance of an account for preparing plans of houses to be erected at Sevenoaks, Kent. It appeared that in July, 1886, the plaintiff was employed by the defendant to get out sketch-plans of some houses at Sevenoaks. Plaintiff prepared the plans, and the defendant came to his office, and approved of them. However, shortly afterwards, the defendant came to him, and said the houses were a little too large for his client, would he (the plaintiff) get out new plans? Plaintiff re-drew the plans on a smaller scale, and reduced the size of the rooms, and the cost of the building altogether. Plaintiff got out a new estimate of cost, and at defendant's request got out a list of the rooms for the plans as re-drawn. The defendant approved of the second or reduced plan, and then asked him to make some rough tracings of them, which he did, and they were also approved of by the defendant. Defendant shortly afterwards asked plaintiff to do some of the work, and plaintiff said he would agree to do it if Mr. Allen would settle the former account, but Mr. Allen refused to do that.

Mr. Start, architect and surveyor, Colchester, was now called, and he said that he had examined the plans, and the amount charged was fair and reasonable.

Other witnesses having been heard, the Judge (Dr. Abdy) gave a verdict for the plaintiff, with costs.

## METROPOLIS MANAGEMENT AND BUILDING ACTS AMENDMENT BILL.

SIR,—This Bill is really of a most sweeping and confiscatory character, as a closer study of its provisions shows,—even more so than pointed out by your correspondents last week. It is very doubtful whether the Board, in view of the Royal Commission to examine into its actions and its proposed abolition, should be given any further powers affecting private interests, but in any case the powers it asks for are extreme. Under clause 12, Vestries may compulsorily take part only of premises; clauses 18, 20, and 21 restrict present rights of building; while clause 23 makes absolutely subject to the local authority's consent any right to make a road over land at any time before excavated. The most serious clauses, however, are Nos. 22 and 28. Clause 22 gives the Board control over the designing of all accesses to more than one dwelling-house, thus to a large extent taking out of the architect's hands and placing in those of the Board the arrangement of workmen's dwellings, besides necessitating three months' delay.

Clause 28 is purely confiscatory. It extends to all new buildings in London the required open spaces now only necessary on land not before built upon, and requires such open spaces to extend *the entire width of every building at the rear*, thus at a blow diminishing not only practically every corner building in the City and West End that may be rebuilt, but also, in the like case, reducing the available accommodation in many buildings in the closely-built town districts.

In any case these two clauses should be struck out of the Bill. MODERATOR.

*London*, March 21, 1888.

## TENDERS FOR THE SUPPLY AND FIXING OF IRONWORK.

SIR,—May we, in your columns, venture to suggest to Borough Engineers and Surveyors that when inviting tenders for the "supply and fixing" of ironwork, such as fencing, &c., they should separate the two?

The work would be done cheaper, as ironfounders now hesitate to quote when fixing has to be arranged for, at a distance from home, of some perfectly simple job. GEORGE WRIGHT & Co.

*Rotherham*, March 17.

# The Student's Column.

## IRON.

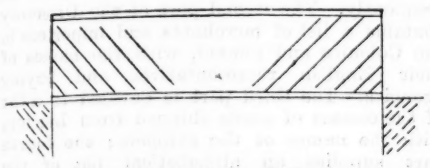
XII.—SHEARING STRESSES.

THE shearing stresses or forces which act on girders in a vertical direction, tending to shear the girder through, are transmitted to the supports through the web connecting the flanges. Unlike the flange stresses, the shearing stresses are at a minimum in the centre of the girder, and at a maximum at the abutments. The stresses in the webs of girders are somewhat ambiguous and indefinite, but experiments on thin webs have thrown some light on the subject. Girders with thin webs have, when loaded beyond their strength, shown signs of failure by the buckling of the web in diagonal lines at an angle of about 45°, as shown in fig. 1,—thus giving evidence that the chief lines of strain are also at angles of 45°, or at right angles to the lines of buckling shown in fig. 1. The failure of the web also indicates that stiffeners placed in a direction at right angles to the buckling would be more effective than vertical stiffeners, but, for practical reasons, the vertical position is nearly always adopted.

The diagrams showing the proportional intensity of the shearing stresses under

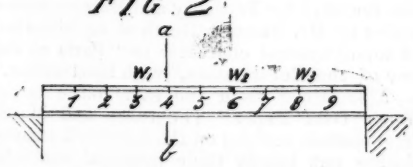
different conditions have already been given in article x. (*Builder*, p. 179), and we shall now give formulæ expressing their values. In a semi-girder loaded at the extremity, the whole load is transmitted to the abutment, and the shearing stress is of the same intensity throughout, being equal to the reaction at the support = W. In a semi-girder uniformly loaded the shearing stress at any point is equal to the load sup-

FIG. 1.



ported between that point and the unsupported end of the girder, and attains its maximum value = W at the abutment. In a girder supported at both ends and loaded in the centre, the shearing stress will be the same throughout, and at any point will equal the reaction of the supports = $\frac{W}{2}$. In a girder supported at the ends, and loaded uniformly throughout, the shearing stress at any point will be equal to the sum of the loads between that point and the centre of the girder, and will attain its maximum value at the abutment, which will be equal to the reaction = $\frac{W}{2}$. In a girder supported at the ends, and loaded at an intermediate point, the shearing stress will equal the reaction of the nearest support, and will attain its maximum value in the shortest segment of the girder. In a girder supported at both ends, and unsymmetrically loaded, the shearing stress at any point will equal the reaction of the weights on the right side of the point passing to the left abutment, minus the reaction of the weights on the left side passing to the right abutment: for example, in fig 2, where T = the shearing stress a *ab*, the equation becomes $T = \frac{4W_2 + 2W_3 - 3W_1}{10}$ and the shear at any other point in the girder can be arrived at by a similar expression. The shearing stresses may also be found by another method, as follows:—The vertical forces acting

FIG. 2.




on the portion of the girder to the right of the section *a b* are the reaction of the right abutment acting upwards, the weights $W_2$ and $W_3$ acting downwards, and the shearing stresses at *a b*. The only other forces are horizontal,—that is to say, the horizontal components of the flange stresses at *a* and *b*. The vertical forces must therefore balance each other, or there would be motion. From this it will be seen that the shearing force may be expressed as "the algebraic sum of the external forces on either side of the section, upward forces being positive and downward forces negative." The shearing stresses are, it will be noticed, totally independent of the depth of the girder.

**International Exhibition of Life-saving Apparatus.**—It is proposed to hold an exhibition of an interesting and useful character at the People's Palace, Mile-end-road, next month. We are informed that it will consist of unsinkable war-ships, steam vessels, lifeboats, and rafts for use at sea and from shore. Conferences will be held from day to day, and public discussions on the merits of the exhibits.

**Local Government at Westminster.**—It may be useful to many of our readers to be reminded that from and after the 25th of March instant, the Board of Works for the Westminster District will cease to exist, and that its jurisdiction with all its duties, powers, assets, liabilities, and properties, will vest in and be assumed by the "United Vestry of the Parishes of St. Margaret and St. John the Evangelist, Westminster," as constituted by the Metropolis Management (Battersea and Westminster) Act, 1887, 50 & 51 Vic., cap. 17.

## Books.

*Iron Roofs: Examples of Design, illustrated with Working Drawings.* Second edition. By ARTHUR T. WALMISLEY, M.I.C.E., Fellow of King's College. London: E. & F. N. Spon.

WE welcome the second edition of this book, which has been considerably added to since it first appeared in 1884. The plates have been greatly improved in clearness and distinctness, the sectioning being well defined. To the original matter has been added an appendix containing, in its fifty pages, a number of very interesting and useful diagrams of the strains in different forms of roof trusses, along with tables showing the moments of the horizontal and vertical forces produced by wind pressure and load at different points on the arch of the St. Pancras Station roof, some remarks on the stresses on roofs, and short descriptions of the plates, to which are added forms of specification of the structural ironwork and work connected therewith for the National Agricultural Hall, Kensington; form of contract for the roof of the Carlisle Corporation Markets, with schedules attached; ironwork and roofing contracts for the St. Pancras Station, and a form of agreement for the erection of a structure. As the author states in his preface, he has not attempted to deal with the various means adopted for calculating strains, nor to give any very definite opinion on the advantages of one form of roof over another, but has confined himself almost exclusively to descriptions of existing roofs, giving their general dimensions and form, and, as already noted, he illustrates graphically in the appendix the strains produced by the dead load of the roof itself, its covering and a certain depth of snow, and the moving or intermittent load occasioned by the pressure of the wind on the exposed surface.

As the letter-press, including the appendix, is considerably less than half a page for each plate, the descriptive matter is necessarily very short and limited, and might, we think, have been extended with advantage.

On page 36 is given a catalogue of fifty roofs, arranged in the order of the spans, those from 240 ft. to 200 ft. span heading the list. These are few in number, counting five in all, the St. Pancras roof of the Midland Railway terminus holding the pride of place, the other roofs having a larger span than 200 ft. being that at the Central Station, Glasgow, with a span of 213 ft. 6 in.; the roof of the New-street Station, Birmingham, of the London and North-Western Railway, with a span of 212 ft.; the Lime-street Station at Liverpool, belonging to the same railway company, with a similar span of 212 ft.; and the Central Station of the Midland Railway at Manchester, the span of which is 210 ft.

Between the limits of 200 ft. and 150 ft. span we have seven roofs given in the list; between 150 ft. and 100 ft. span, ten roofs; between 100 ft. and 50 ft. span, twenty-five roofs; and below 50 ft. span, three. The smallest span recorded is that over the Blythwoodholme Arcade at Glasgow, and measures 39 ft. 10 in. between the points of support.

The author has, in many cases, given the cost of the roof described, but he has not apparently found it possible to do so for all, nor are the prices given invariably for the same thing. Sometimes the cost of the iron work only is given, and this does not always include the expense of erection; sometimes the supporting columns are included in the cost, sometimes they are not; some of the prices quoted are for the roof complete, with its covering. This information would have been more valuable if it could have been reduced to one common basis, and prices had been given, first, for iron erected without columns or other form of support; and, secondly, for the complete roof.

We are told that we must not put too much stress on the cost of different roofs, because the conditions are dissimilar, the price of materials being much higher at one time than another; and some such caution is much needed, for the statements of cost are most bewildering. Take the roofs over the New-street Station at Birmingham, the Cannon-street and Charing Cross stations, for instance, the dimensions of each, in the order given, being on the average 201 ft. 3 in. span by 40 ft. 3 in. rise of arch, 190 ft. 4½ in. by 60 ft. and 166 ft. by 45 ft., the cost being, all included, at the rate of 17*l.* 15s., 49*l.* 10s., and 40*l.* per square of 100 ft. measured on plan. The roof of the Queen-street Station at Glasgow, the dimensions of which are 170 ft. span by 44 ft. rise of arch, is said to have cost 21*l.* per square. Bristol Station roof, with a span of 125 ft. and a rise of arch of 31 ft. 3 in., cost 37*l.* 16s.; while St. David's, Exeter, the span of which roof is 132 ft. and the rise of arch 22 ft., cost only 16*l.* 10s. The cheapest roof quoted is that for the Coal Depôt at Millwall, the span being 44 ft. between points of support and the rise of arch 8 ft. 9 in., the cost per square only amounting to 4*l.*, but this roof was, no doubt, covered with corrugated iron without glass or louvres, and it is therefore, very light in itself and has only a very light and inexpensive covering to support; it cannot, therefore, be taken into the general consideration of cost. If, in addition to the cost per square, a statement could have been produced by the author showing the weight of wrought and cast iron used in each roof, it would have added greatly to the interest and value of the work and would have rendered it possible to draw some comparison between the different forms of trusses, and this would be especially the case if the average cost of ordinary girder work per ton at the time when each contract was entered into were added to the record.

We agree with the author that the graphic method of examining into the strains in various structures is reliable, if sufficient care be taken in the execution of the drawings, and they are executed to a large scale.

We are glad to see that the author has added to his list of roofs that for the National Agricultural Hall, Kensington, better known as Olympia, for which he and Mr. Max am Ende were joint engineers, and the roof of the Thorpe Station at Norwich. The former structure is built of steel, and the arrangement for taking up the thrust of the arch and the horizontal force of the wind through the side spans, and balancing these forces by the weight of the roof itself is worthy of notice, and the roof is probably, for its span, the lightest yet constructed.

The plates which illustrate this volume are in general so good that it is to be regretted that those on pages 37 and 38 should not have been brought up to the same standard of excellence.

When we have to notice a third edition, we hope we may have material provided which will enable us to make an economical comparison between the roofs illustrated.

*Geology: Chemical, Physical, and Stratigraphical.* By Prof. J. PRESTWICH, M.A., F.R.S. Vol. II.: Stratigraphical and Physical. Oxford: Clarendon Press. 1888.

IT is eighteen months ago since we noted the appearance of the first volume of this work,* which dealt with chemical and physical geology. The volume before us is a continuation of the physical, and a complete account of the stratigraphical portions of the subject. The first thirty-two chapters are devoted entirely to the description of the aqueous or sedimentary rocks throughout the globe, referring especially to the British sections as being easily accessible types, from the archæan period to the recent, inclusive. The remaining three chapters deal with theoretical questions,—as to the cause and duration of the glacial epoch, the condition of the earth's crust, and the primitive state of the earth. It is rather remarkable that the author should have elected to describe the primitive state of the earth in the last chapter of his great work; one would imagine that it would have been more in place had he given it at a much earlier stage, if not in the first chapter of the first volume. Although of intense interest, and bristling with new facts and original points, the second volume is not so useful to the majority of our readers as the first, which dwelt at some length with questions relating to water supply, &c. The well-known researches of the author in regard to the practical side of geology, however, form a sufficient guarantee that this use of the science would not be altogether neglected. We are not surprised, therefore, that here and there, after describing the lithological and palæontological features of each deposit, a few practical hints are thrown out in regard to economics. Consequently, the Devonian, Permian, and Oolite building stones; the Devonian, Carboniferous, and Purbeck marbles; the Lias hydraulic cements; the Trias and Cretaceous water-

* See *Builder*, vol. li., p. 367.

bearing beds; coal measures; salt and gypsum deposits, are each in their turn alluded to. There does not appear to be any new information given respecting these various items; the references are short, but to the point. Indirectly, of course, the whole subject matter of the work is of practical importance, dealing, as it does, with the distribution of the pervious and impervious rocks throughout the country. The sections drawn are of much value, showing the disposition of the strata underground. The uses of the fossils, too, of which the book largely treats, cannot be overlooked. It is true that, although they are of much assistance to naturalists as indicating the life history of the former inhabitants of the globe, yet their practical value besides is enormous. Leaving out of the question their utility in proving the presence or absence of the coal measures, and other similar valuable deposits in particular localities, they have a direct bearing on water-supply questions. For instance, in well-sinking, the geologic age of the strata passed through can, in many cases, only be demonstrated by the fossils found, especially at great depths. It is conceded, on all sides, that to arrive at an approximate idea of the quantity of water available in any given stratum, one of the most important factors in the inquiry is as to whether the bed concerned is continuous from place to place; and inasmuch as certain fossils characterise each bed, it will be seen that the proof of the continuity or otherwise of water-bearing strata is greatly facilitated by these seemingly insignificant remnants of organic life in past ages. These historic details are well put forth in the volume, but of course they belong to the technique of the science, into which we cannot enter. Numerous finely-executed plates of the more characteristic fossils are interspersed throughout, and the description of the more striking examples are amongst the most interesting features of the work. It is gratifying to observe that the geology of foreign countries is so fully noticed, but the tables of equivalents would be more useful if they were displayed as one table on a folding sheet. The large folding coloured geological map of Europe, by Messrs. Wm. Topley and J. G. Goodchild, of the Geological Survey, which forms the frontispiece, supplies a want long felt by geologists. We must heartily congratulate the author on the production of the whole work.

## VARIORUM.

"Lockwood's Builder's and Contractor's Price-Book, 1888," edited by Mr. Francis T. W. Miller, A.R.I.B.A., and published by Messrs. Crosby Lockwood & Son, Stationers' Hall-court, contains, as in previous issues, a great deal of useful information apart from the ordinary contents of a "price-book." Some of the prices seem to be rather high, even "for the best materials and workmanship of their kinds," *plus* allowance for packing, carriage, risk, and "a fair profit"; but, on the other hand, materials in general seem to show a tendency to rise in price, and the Editor, in his preface, refers with satisfaction to this as,—in conjunction with other circumstances,—indicating that the present year will witness a revival of business in the building trade. We hope so.——"Laxton's Builders' Price-Book for 1888" (London: Kelly & Co., Great Queen-street) contains above 72,000 prices, and has now reached its 71st edition. It fully maintains its old reputation, and gives the text of the whole of the Metropolitan Building Acts, with notes of cases and decisions, the By-Laws of the Metropolitan Board of Works, list of District Surveyors, &c. But the way in which the Districts are grouped under the old metropolitan Parliamentary boroughs as they existed prior to the Redistribution Act of 1885 is somewhat antiquated.——Mr. W. F. Hobbs, R.P. (which letters, as many of our readers will know, signify "Registered Plumber"), of Melbourne-street, Stalybridge, has sent us a very useful little book (small enough to go in the waistcoat-pocket) containing price-lists of painters', paperhangers', and decorators' work, and giving a great deal of useful information and many practical hints on each branch of work. It really forms a small "price-book" for the trades mentioned, and with its aid a tradesman asked to give on the spot a price for a job of painting and paperhanging could do so with justice both to himself and to his "client."——Messrs. G. Bailey Toms & Co., of Laurence Pountney-hill, have sent us a very useful "List of Angle, Bulb, Tee Iron and Steel," with the various sections illustrated and the dimensions in which they may be obtained figured. The list is mounted for hanging up in the office, where it will be found very useful.——Messrs. Pattinson & Co., builders' merchants, Sleaford, have sent us a useful folding-card, entitled "The Builder and Contractor's Pocket Companion." It gives in a concise form much useful information.——"Sell's Directory of Registered Telegraphic Addresses," combined with Sell's "Telegraphic Code" (London: Henry Sell, 167, Fleet-street), is an exceedingly useful handbook for the counting-house. "The Directory of Registered Addresses" is divided into two sections, the first having the names of firms alphabetically arranged, and the second containing the telegraphic addresses alphabetically arranged, so that any one can see at a glance what is the telegraphic address of any one of the twenty thousand and more firms whose names are given, or, conversely, can find the owner of any one of the same number of telegraphic addresses,—a large proportion of which on the face of them contain no clue to elucidation. Mr. Sell has performed a great public service in getting together, by his own enterprise, so large a number of these registered addresses, for it appears that not only does the Post Office not publish such a list, but it refuses inspection of it by those who do! Consequently, while Mr. Sell has taken great pains to make his "Directory" as complete as possible, he has of course only been able to insert such addresses as have been sent to him by individual firms. The "Telegraphic Code" which is added is a very useful one, and likely to meet most business requirements, and there is an appendix of code-words which can be filled in by each user with special phrases to meet his own wants. The subscription for the whole, including three quarterly supplements to be issued during the year, containing all further addresses to hand each quarter, is only 5s.——"The Advertiser's A.B.C." (published by T. B. Browne, 163, Queen Victoria-street, and 402, Strand, W.C.) is an admirably-arranged and well-printed directory of the Press of the United Kingdom, India, and the Colonies. It will be of great value to advertisers, inasmuch as it gives the official scales and charges of all journals which take advertisements. The classification and indexing are very complete, and the work, which contains a thousand pages, is published for half a guinea. In this Directory one may learn all about the papers; at Mr. Browne's well-appointed "London Central" Newsrooms, in the Strand, one may see them all, including the Indian and Colonial papers as soon as the mails arrive.——"The British and Foreign Trade and Shipping Telegraph Code, by H. R. Meyer (London: Hamilton, Adams, & Co.), is a useful handbook for the use of merchants, manufacturers, bankers, and business men generally. It is described as the English edition of "Le Code Télégraphique Universel," and as "designed for the purpose of shortening and cheapening commercial telegrams, facilitating intercourse and developing trade between the United Kingdom and her colonies and the United States, with France, Belgium, and all French and English speaking nationalities."——"The Australasian Federal Directory of Commerce, Trades, and Professions, 1888–1889" (London: John Haddon & Co., 3, Bouverie-street), is a well-got-up and bulky directory, printed by Messrs. Clay & Sons, of Bread-street-hill. It consists of two sections, one alphabetically arranged, and the other containing classified lists of professions and trades. Australia and New Zealand are apparently so well supplied with architects that the latter seem likely to be able to get on very well without accessions to their ranks, at any rate to the end of next year, 1889, which the Directory prospectively covers (we presume it is to be issued every two years). Builders and contractors, and the various trades connected therewith, are also very much *en évidence*, The Directory contains some interesting statistical and other matter relating to Australasia, as well as several maps, constituting the "Australasian Federal Atlas." The work is edited by Mr. J. W. F. Rogers, F.R.C.I., Melbourne and Sydney, and is of more than passing interest.——"The Mercantile Year Book and Directory of Exporters, 1888," edited by Walter Lindley Jones (London: Lindley Jones & Co., 46, Watling-street), is described on the title-page as "a walking guide to the wholesale and export businesses of London in street order." Accordingly, we find the first part of the book arranged with a number of "Itineraries," giving the names of the merchants and manufacturers in the various streets, the goods they manufacture, sell, or export, and the ports of shipment. Under the head of "Goods Shipped" the words "general" and "every description" very frequently occur; and under the heading "Ports," the words "all ports" and "various" are found almost as frequently. The second part of the Directory contains a list of merchants and importers in the Colonies and abroad, with the names of their English representatives and buying agencies. The third part is devoted to a list of the classes of goods shipped from London, with the names of the shippers; the fourth part supplies an alphabetical list of the merchant exporters of London; and the fifth part contains shipping and forwarding information, with the tariffs and import duties of the British Colonies and possessions. Altogether it is a very handy and compact volume, and is well printed and got-up.——From Messrs. Cassell & Company we have received Part I. of the "new and revised edition" of their "Technical Educator," which contains the commencement of series of articles on "Building Construction," "Projection," "Civil Engineering," "Practical Geometry applied to Linear Drawing," "Decorative Design," and other subjects of interest to our readers. It is to be completed in twenty-six monthly parts, at 6d. each.——The "Quiver" for February (Cassell & Co.) contains a paper on "Some Remarkable Church Towers," with small sketches of examples at St. Michael's, Beccles; Worstead, Norfolk; Yatton, Somerset; All Saints', Derby; and Jarrow. The March number contains a view of Milton's cottage at Chalfont St. Giles as it now stands.——In "Cassell's Magazine" for March there is an interesting account of the work done by Mr. William Rossiter in promoting art galleries and free libraries in some of the districts of South London.—— From the Religious Tract Society (London: 56, Paternoster-row) we have received the "Leisure Hour." The number for February contains an interesting article by that well-known scholar and antiquary, the Rev. Canon Creighton, on "Gloucestershire," illustrated by views of Tewkesbury Abbey, Berkeley Castle, &c.—The "Sunday at Home" (published by the same Society) for February and March contains articles by Mr. Richard Heath of an historical and topographical character on "Paris at the Time of the Reformation," with illustrations."——Also issued from the same office is the "Boy's Own Paper" (February and March parts) contain articles on the London Museums, pointing out briefly their principal contents, and how and when to see them. Comparatively few Londoners have any idea of the number of museums open to them, and of their varied treasures. These articles, although avowedly only written for boys, may be usefully perused by their elders.

*Maps.*—Mr. Edward Stanford, of 55, Charing Cross, has sent us a new map of London and environs showing the proposed new railways, tramways, and miscellaneous improvements, for which plans were deposited at the Private Bill Office on November 30th last, and which are now before Parliament. The schemes are not very numerous, consisting of seven railway projects, nine tramway projects, and nine miscellaneous projects; of the latter, about half the number are promoted by the Metropolitan Board of Works, and these include the Blackwall Tunnel under the Thames, and several schemes for new parks and open spaces. One of the schemes figured on the map is designated "The South Metropolitan Electric Lighting," but this is very much of a misnomer, as the district south of the Thames scheduled by the scheme includes only a comparatively small area, mainly occupied by Waterloo Station. A better name for the area scheduled would be the "City, Strand, and Westminster," for it includes Fleet-street and the Temple, Lincoln's Inn, Great Queen-street, Long-acre, Piccadilly, (part of) Pall Mall, St. James's Park, Queen Anne's-gate, the Houses of Parliament, Whitehall, Charing-cross, the Strand, and the whole length of the Victoria Embankment.——From Messrs. Bemrose & Sons (London and Derby) we have received a large folding map of the North Warwickshire, South Staffordshire, and East Worcestershire Iron and

Mineral Districts, showing the names of firms and the railways and canals on which their works are situated, the chief turnpike roads, tramway routes, &c. The map has been compiled from the Ordnance Survey, railway maps, &c., by Mr. E. J. Blake, and is a model of clearness, although somewhat unwieldy. It is mounted on linen, and the various railways and canals are marked with distinguishing colours, showing choices of conveyance where they exist. The map will be very useful, but it might be somewhat reduced in scale, as it appears to us, without any serious diminution of clearness, for it is not a map which can be said to be overloaded with detail.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

4,300, Plumbers' Traps. W. McKechnie and G. W. Wicks.

The object of this invention is to devise a metal mould whereby the body of the trap may be produced economically and expeditiously, and also to devise means whereby the mouth of the cast or compressed or cast and drawn trap body may be fashioned into a contracted neck, and a screw-threader nut or nut and washer secured therein. The machinery whereby this is effected is elaborately described, and no fewer than thirty-four claims for parts and details are found at the end of the specification.

4,634, Brickmaking Machinery. T. C. Fawcett.

In brick-making or tile-pressing machines with toggle-jointed levers, an improvement is effected by this invention by lengthening the stroke of the crank or the length of the connecting rod in such a manner that the toggle-jointed levers go past the centre, in doing which they give one squeeze to the brick, and on the return, or as they come back, they give another squeeze. By this means a double action is given to the levers for one revolution of the crank, consequently a saving of time is effected.

5,115, Stoves. D. Cowan.

This invention relates principally to stoves from which the smoke is led away by a pipe, and instead of making arrangements for either a vertical or horizontal pipe both are provided for on one pattern of stove by making the smoke-flue inside the stove communicate with two openings, one in the top and the other in the back of the shell or outer casing of the stove. These two openings are of exactly the same size, and a single cap or closing-plate is provided for closing whichever of the two openings the smoke-pipe is not fitted to. This closing-plate is by preference made so as when in position to be flush with the outside of the stove, and it is fitted with a bayonet joint, so that it is secured by turning it partly round after placing it in the opening.

5,253, Discharge of Rain-water from Roofs. J. G. Killey.

According to this invention, a tank or cistern with two outlets is made, down the first one of which all the rain-water which comes from the roof passes. When so much as is deemed soiled has passed, a ball-cock or valve, controlled by the float, closes one outlet, and the clearer rain-water is led through the other outlet to a suitable receptacle.

5,374, Water-tight Doors. J. W. Shepherd.

For the purpose of quickly closing water-tight doors, or other emergency doors, a series of levers with heavy weights are proposed by this inventor. The weights being released act on the levers, and at once automatically close the door instead of the slower process of spindles, or wheels and gearing.

9,627, Fireproofing Columns, &c. F. Pilkington.

The tiles, blocks, bricks, &c., used by the inventor, are made of fireproof material, cast in segments, and fastened on to columns, girders, &c., by keys. A key-way is cast or cut on the column, and into this the piece fits and protects it. Tongued blocks of concrete form the centre keying to arches, &c., but the idea is always to fit one part in with another, so that it shall hold together in case of fire, and the inner structure of wood or iron shall always be protected.

### NEW APPLICATIONS FOR PATENTS.

*March* 9.—3,634, W. Fraser, Noiseless Closing of Doors.—3,635, S. Wilmot, Galvanised Sheet Iron Roofing.—3,663, J. McCallum, Fire Grates.—3,664, D. Bacon, Wood-turning Machinery.—3,680, D. Pugh, Gully Grids or Sanitary Traps.

*March* 10.—3,695, R. Roberts, Prevention of Downdraught in Chimneys.—3,697, W. Morris and L. Wilkinson, Fire Grates.—3,708, R. Lee, Fireproof Ceilings, Walls, Doors, Floors, &c.—3,709, P. Ogilvie, Holders for Window-sashes.—3,727, J. Lander, Fireproof Building Construction.—3,729, W. James, Regulating the Discharge of Water for use in Flushing Water-closets, Drains, &c.—3,737, H. Vaughan and W. Trubshaw, Attaching Door-knobs to Spindles.—3,752, O. Imray, Composition for Pavements and Building Blocks, and for the Manufacture of Fireproof and Preservative Paint.—3,761, C. Cook, Sash-holder.

*March* 12.—F. de Conick, Incombustible Paint.

*March* 13.—3,856, T. James and H. Brookes, Window-sashes.—3,879, L. Redmayne, Prevention of Down-draught or Smoky Chimneys.—3,882, J. Breeden, Flushing Water-closets, &c.—3,888, A. Boult, Door-hinges.

*March* 14.—3,924, J. Jones, Portable Buildings, &c.—3,930, J. Worthington, Connecting Door-knobs to Spindles.

*March* 15.—4,003, E. Verity and Others, Attaching the Knobs of Locks to Spindles.—4,012, T. Dykes, Self-locking Cant applied to Sash-fasteners.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

16,459, D. Knowles, Sash-fasteners.—17,488, J. Harcourt, Slide-bolt and Indicator for Water-closets, Office-doors, &c.—1,004, G. Wright, Brick Block or Slab for Building.—1,140, G. Henderson, Securing and Releasing Doors.—1,255, J. Kaye, Bolting and Unbolting Doors, Windows, &c.—1,480, G. and C. Duffy, Window and Door Fasteners.—1,507, R. Adams, Springs for Doors, &c., and in Adjustments and Checks for Preventing Slamming.—1,543, C. Homer, Opening, Closing, and Fastening Fanlights, Skylights, &c.—1,717, P. Clark, Fire-stoves for Preventing Down-draughts in Chimneys.—1,819, E. Lucas, T-Squares.—1,880, J. Harley, Setting Saws.—1,979, G. Sharpe and F. Turner, Cement for Plastering and Moulding.—2,195, J. Hall, Kitchen Grates.—2,226, G. Ewart, Window Ventilation.—2,256, W. Carden, Grates or Fireplaces.—2,288, H. and J. Storey, Decorative Material for Walls, &c.—2,334, J. Walker, Mounts for Door-knobs, &c.—2,385, H. Johnson, Ventilators for the Supply of Warm or Cold Air.—2,397, A. Tuck, Finger-plates for Doors.—2,496, H. Johnson, Ventilators Discharging into Smoke-flues.—2,605, E. Dean, Cooling and Ventilating Apartments and Buildings.—2,650, E. Johnson, Composition for Cleaning Wall-papers, Papered Ceilings, &c.—2,632, J. Robertson and J. Patrick, Portland Cement, &c.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to Opposition for Two Months.*

6,649, W. Anderson, Ventilating Sashes.—6,887, J. Jackson, Water-waste Preventing Syphon Cisterns.—6,990, L. Sunter, Water-closets.—14,381, B. Banks, Flushing Cisterns or Water-waste Preventers.—793, G. Webster, Mitre Planing Machine.—883, S. Adams, Ventilating Sewers, Drains, &c.—935, S. Turner, Roof-tile.—2,043, W. Davis and J. Crouch, Draught Excluders for Doors.—2,164, G. Wimpey, Joint for Water, Gas, and other Pipes.

## RECENT SALES OF PROPERTY.

### ESTATE EXCHANGE REPORT.

MARCH 13.

By E. J. GAIRDNER.

Plumstead—An Enclosure of Land, 4a. 1r. 38p., freehold ..... £1,800

By RUSHWORTH & STEVENS.

Chelsea—26, St. Leonard's-terrace, freehold ..... 1,850

By ROGERS, CHAPMAN, & THOMAS.

Fulham—40, Sherbrooke-road, 88 years, ground-rent 5*l.* 10s. ..... 250
West Brompton—10, St. Oswald's-road, 83 years, ground-rent 12*l.* ..... 405

By WESTON & SON.

Brixton—43, Loughborough Park, 35 years, ground-rent 5*l.* 5s. ..... 280
Clapham Junction—94, Eversleigh-road, 83 years, ground-rent 3*l.* 3s. ..... 335
Walworth—Ground-rent of 8*l.*, reversion in 32 years ..... 265

MARCH 14.

By INMAN SHARP & HARRINGTON.

Rotherhithe—29, 31, 33, and 35, Union-road, 72 years, ground-rent 2*l.* ..... 1,650
A plot of land in Union-road, 72 years, ground-rent 10s. ..... 390
63, Albion-street, freehold ..... 400
Ground-rent of 12*l.*, reversion in 71 years ..... 170

By R. TOMLINSON & CO.

Chelsea—19, Tadema-road, 93 years, ground-rent 7*l.* 10s. ..... 375

By HARMAN BROS.

Islington—29, Oakley-road, 54 years, ground-rent 6*l.* ..... 415
35, Oakley-road, 54 years, ground-rent 6*l.* ..... 395
94, Englefield-road, 52 years, ground-rent 10s. ... 500
Old Kent-road—20, Ossory-road, 34 years, ground-rent 6*l.* ..... 370

MARCH 15.

By T. G. LANGRIDGE.

North Kensington—29, Treverton-street, 75 years, ground-rent 7*l.* ..... 165
6, Wheatstone-road, 88 years, ground-rent 7*l.* 10s. ..... 265

By H. W. SAFFELL.

Southwark, 77, London-road—The lease of, term 3½ years ..... 315
80, London-road—The lease of, term 4½ years ..... 50

By PHILLIPS, LEA, & DAVIES.

Holloway—1, George-street, freehold ..... 240

By EDWIN SMITH & CO.

Belgravia—An improved ground-rent of 35*l.*, term 36 years ..... 1,000
An improved ground-rent of 132*l.*, term 35 years 1,450
An improved ground-rent of 86*l.*, term 36 years 880

By H. J. BLISS & SONS.

Kingsland—18 and 20, Philip-street, freehold ..... 550
Spitalfields—A moiety of Nos. 5 to 16, Fashion-street; 1 to 15, New-court, 16 years, ground-rent 107*l.* 10s. ..... 1,080

By J. GRIFFIN & SON.

Ealing—35 and 36, High-street, freehold ..... £2,300

By W. HALL.

Ealing—Ground-rent of 35*l.* a year, reversion in 52 years ..... 2,230
Tottenham, High-road—The Chesnuts, with grounds, freehold ..... 1,900
Clerkenwell Close—A block of Freehold Artisans Dwellings ..... 1,900
Ealing—Ground-rents of 11*l.* 19s. a year, reversion in 35 years ..... 430
Kilburn—Ground-rents of 22*l.* a year, reversion in 97 years ..... 520
West Hampstead—Ground-rents of 27*l.* 10s., reversion in 97 years ..... 630
Willesden—Ground-rents of 30*l.* a year, reversion in 95 years ..... 690
Hendon—Ground-rents of 36*l.* a year, reversion in 95 years ..... 815

By NEWBON & HARDING.

Highbury—27, Highbury Quadrant, 61 years, ground-rent 17*l.* 17s. ..... 1,280
208, Blackstock-road, freehold ..... 330
1 and 3, Elwood-road, freehold ..... 355
Wood Green—3, 4, and 5, Finsbury-road, freehold 1,140
Nightingale-road, a plot of freehold land ..... 170
Barnsbury—6 and 8, Westbourne-road, freehold ... 1,550
Islington—195 and 197, Liverpool-road, 11 years, ground-rent 14*l.* ..... 300
Hammersmith—14, Nasmyth-street, freehold ..... 300

MARCH 16.

By NORTON, TRIST, GILBERT & CO.

Rotherhithe—112, Rotherhithe-street; and 1, Princes-street, freehold ..... 355

By WEATHERALL & GREEN.

St. James's, 90, Jermyn-street—The lease of, term 16 years ..... 610

By A. RICHARDS.

Upper Holloway—Ground-rent of 4*l.* 10s., reversion in 66 years ..... 100
Kentish Town—Ground-rents of 15*l.*, term 70 years 280
Ground-rents of 23*l.* 10s., term 62 years ..... 430
Haverstock Hill—Ground-rents of 7*l.*, term 62 years ..... 120

By REYNOLDS & EASON.

Shoreditch—Ground-rent of 100*l.* a year, reversion in 87 years ..... 2,225
Wandsworth—32, 34, and 36, Cologne-road, freehold ..... 905
Peckham—73, Tilson-road, 75 years, no ground-rent ..... 200
Hackney—13, King Edward-road, 35 years, ground-rent 10s. 6d. ..... 540
Improved ground-rent of 6*l.* 9s. 6d., term 35 years ..... 95
34, Glaskin-road, 67 years, ground-rent 4*l.* 4s. ... 295

## MEETINGS.

SATURDAY, MARCH 24.

*Architectural Association.*—Visit to Meistersingers' Club House, St. James's-street, W. Assemble 3 p.m. Passes.

*St. Paul's Ecclesiological Society.*—Visit to St. Paul's Cathedral, 2·30 p.m.

*Edinburgh Architectural Association.*—Visit to Riccarton House and Gogar House.

MONDAY, MARCH 26.

*Society of Arts (Cantor Lectures).*—Professor W. Chandler Roberts-Austen, F.R.S., on "Alloys." III. 8 p.m.

TUESDAY, MARCH 27.

*Society of Arts (Foreign and Colonial Section).*—Mr. J. Stephen Jeans on "The Panama Canal." 8 p.m.

*Institution of Civil Engineers.*—(1) Further discussion on Mr. P. W. Williams's paper on "Economy-Trials of a Non-Condensing Steam-Engine—Simple, Compound, and Triple." (2, time permitting) Paper by Mr. Arthur Ayres on "Compressed Oil-Gas and its Applications." 8 p.m.

WEDNESDAY, MARCH 28.

*Civil and Mechanical Engineers' Society.*—Mr. Ambrose A. Myall on "The Development of Machinery in Relation to Hand Labour." 7 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Quarterly Meeting of the Directors. 8·30 p.m.

## Miscellanea.

**The Proposed Church House.** — The London correspondent of the *Manchester Courier* writes:—The scheme for the establishment of a Church House in London has now taken definite shape, the Executive Committee of the body formed to promote it having to-day [Tuesday] made arrangements for incorporation. A site has been found for the institution near Westminster Abbey, and as the Church House Fund has reached about 60,000*l.* building operations will probably begin at an early date.

**Salters' Hall, St. Swithin's-lane.** — Messrs. Thomas Potter & Sons have just supplied to the Salters' Company some wrought-iron gates with massive stone piers. The centre gates were manufactured by this firm many years ago, and exhibited in the Exhibition of 1862. They were designed by the late Mr. Thomas, sculptor, who also made the piers. Messrs. Potter & Sons have slightly modified the design to suit their present position, and have also made the two side gates to correspond.

**Glass for Picture Galleries.**—In reference to a letter on this subject in our last [p. 198], we may mention that the rooms of the Institute of Painters in Water Colours are glazed with the glass named by our correspondent, "Hartley's patent rough-rolled." This is a very satisfactorily lighted room.

**The Parkes Museum.**—The Court of Common Council have just made a donation of twenty-five guineas to this Museum to aid in its work of practical teaching and demonstrating sanitary science. The fifth course of Lectures for Sanitary Inspectors has been arranged for. The lectures will be given on Tuesdays and Fridays, at eight p.m., in the Parkes Museum, 74A, Margaret-street, W., and students attending the course will be granted free admission to the Museum and Library from April 1st to June 1st. A nominal fee of 5s. for the course will be charged to cover the necessary expenses. Students desirous of attending the lectures are requested to send in their names at once to the Secretary of the Museum, 74A, Margaret-street, W. The following is the syllabus:—April 10, Introductory Lecture, General History, Principles, and Methods of Hygiene. By Mr. A. Wynter Blyth, M.R.C.S. April 13, Ventilation, Measurement of Cubic Space, &c. By Sir Douglas Galton, F.R.S. April 17, Water Supply, Drinking Water, Pollution of Water. By Dr. Louis Parkes. April 20, Drainage and Construction. By Mr. E. C. Robins, F.R.I.B.A. April 24, Sanitary Appliances. By Prof. W. H. Corfield, M.D. April 27, Scavenging, Disposal of Refuse and Sewage. By Mr. H. Percy Boulnois, M.Inst.C.E. May 1, Food (including Milk), Sale of Food and Drugs Act. By Mr. Charles E. Cassal, F.C.S. May 4, Infectious Diseases and Methods of Disinfection. By Mr. Shirley F. Murphy, M.R.C.S. May 8, General Powers and Duties of Inspectors of Nuisances: Method of Inspection. By Mr. J. F. J. Sykes, M.B. May 11, Nature of Nuisances, including Nuisances the Abatement of which is Difficult. By Mr. J. F. J. Sykes, M.B. May 15, Sanitary Law, General Enactments, Public Health Act, 1875, Model By-laws. By Dr. Charles Kelly, F.R.C.P. May 18, Metropolitan Acts, By-laws of Metropolitan Board of Works. By Mr. A. Wynter Blyth, M.R.C.S.

**Conditions of Tender.**—At the Hornsey Local Board on Monday, a question of some importance to contractors occupied attention. The Chairman (Mr. H. R. Williams) said at the previous meeting the tender of Messrs. F. A. Jackson & Co., for making up Atterbury-road, was accepted by the Board; but the next morning the Surveyor found that the conditions of the advertisement had not been complied with, the contractors having failed to price the quantities. That being the case, he held that the tender was void, and they must accept one of the others or advertise again. Colonel Bird.—Suppose I am the contractor, and I object to your quantities, and take my own? The Chairman.—Then you are out of court. Colonel Bird.—I don't think so. I can take my own quantities if I choose. Mr. Robins.—One of the conditions of contract is that the contractor shall take the Board's Surveyor's quantities. Colonel Bird.—Then the sooner the condition is done away with the better, and I give notice of motion that in future, contractors shall be allowed to take out their own quantities. Mr. T. de Courcy Meade (Surveyor) said if a motion of the kind was carried the Board would have heavy accounts for extras on all future contracts. Col. Bird repeated that a contractor had a right to take out his own quantities. The Chairman said the terms of advertisement distinctly stated that the quantities must be priced. Mr. Ashey.—The Board accepted the tender upon certain conditions; supposing that Messrs. Jackson say they are ready to fulfil those conditions, are you not bound to give them the contract? The Chairman.—Do you think it would be fair to other contractors? Mr. Ashey: That is not the question. The Solicitor being appealed to said he considered that it having been found that the terms of the advertisement had not been complied with, the Board could reverse their resolution accepting the tender. This course was adopted, and it was agreed to advertise again.

**Loch Katrine Extension Water Works.** Progress with the Craigmaddie service reservoir (eight miles north of Glasgow) has long been dissatisfying to the engineers of the Corporation, and matters this week have been brought to a head by the breaking of the contract under an arbitration decision unfavourable to the contracting firm. The works on the puddle trench have been stopped, and the entire squad of workmen paid off, pending an arrangement with new contractors for a more vigorous prosecution of the undertaking. Meanwhile, the various tunnel boring contracts are making very satisfactory headway.

**The New Assize Courts, Birmingham.**—The *Birmingham Daily Mail* reports the progress of the new Assize Courts, of which Messrs. Aston Webb & Ingress Bell are the architects. The main walls of the building are now complete up to the ground-floor. Of the great hall the main walls are up sufficiently to receive the girders which are to support the flooring. The greatest progress has been made with the Steelhouse-lane front, where the terra-cotta work has already been commenced, and will now be gone on with in the public passage, which forms a road from Corporation-street to Steelhouse-lane along the lower side of the Courts. The Corporation-street front is up to the ground level, and the bases of the main columns are already fixed. The various Courts, and the general divisions of the building, are also now defined by the beginnings of the walls. The lowest section of each of the Courts, as far as they have at present progressed, will be made into a cold-air chamber, from which the ventilation flues will be conducted. It is stated that it will be possible to regulate the flow of air to a nicety, and so to keep the Courts at any temperature that may be desired. The boilers for the steam heating arrangements are ready to be fixed in their position in the basement under the central hall. The *Mail* says that with such a complete scheme of ventilating and heating, it will hardly be possible even for her Majesty's Judges, who have all highly original and strangely varied views on the subject, to resort to the expedients of window-opening and draught-creating, of which every litigant has painful remembrances. We shall see. The severe weather has given Mr. Charles Osborne, the Clerk of the Works, a great deal of trouble, the work having been considerably delayed, and much of it having to be replaced. We published a view and plan of the Courts in the *Builder* for July 31, 1886.

**The Regent's Canal Railway.**—It is now about four years since an Act of Parliament was obtained for the construction of a railway from Paddington to the Regent's Canal Dock at Limehouse, running almost parallel with the canal itself, together with a branch to the City, near Barbican. Up to the present time the carrying out of the undertaking has remained in abeyance, but there is now a prospect of the works being shortly commenced. It appears that the conditions of a contract for the construction of the line have been arranged, and that negotiations are now in progress for underwriting a large portion of the required capital. According to the opinions of the financial advisers of the scheme, there is every probability of these negotiations being successful. Should this prove to be so, a prospectus will be issued at once. The powers of the company for the purchase of lands would have expired last autumn, but during the session of 1887 a Bill received Parliamentary sanction extending the time for two years as regards the general undertaking,—the direct line from Paddington to the docks at Limehouse,—and for three years for the City extension; and the directors have now resolved to go on with the line from Paddington to the docks in the first instance, suspending, for the present, the City extension, which will be very costly, whereas the outlay for the direct line will be comparatively small, in consequence of the canal and certain lands adjoining it being already in the hands of the company by purchase. Should the London, Tilbury, and Southend Company succeed in the application which they are now making to Parliament for powers to make a junction with the line, and subscribe towards the cost of construction, it will, of course, be of material assistance, financially, to the Regent's Company.

**A New Gas-fired Kiln for Pottery.**—At the Wilderness Terra-cotta Works, Mitcheldean, Gloucestershire, there is now in operation a new form of pottery kiln which embodies several improvements. It is recuperative, and is so arranged that a perfectly uniform muffle temperature can be obtained. It is found, in order to effect economical results, that at least two kilns are required, and an additional kiln is to be constructed which will contain several improvements. The kiln has been constructed by Mr. Miller Carr from the designs of Mr. B. H. Thwaite, C.E., F.C.S., of Liverpool.

**Handsworth**—The St. James's National Schools are about to be enlarged, from plans by Mr. J. R. Nichols, architect, Birmingham. Mr. C. A. Horton, of Brierley Hill, is the contractor.

**Boulders.**—At the Spring *soirée* of the Scientific Students' Association, held on the 16th inst. at the Memorial Hall, Manchester, Professor W. C. Williamson, who presided, delivered a short lecture on boulders, with special reference to the boulder recently discovered in Oxford-road, and described in the *Builder* for February 4th last, p. 92. That particular boulder, Professor Williamson said, was larger than any he had ever seen. He did not favour the theory that the boulder was brought to the position in which it was found by the action of fresh water. It was scarcely possible to conceive any torrent capable of moving it. He attributed the presence of the stone in Oxford-road to glacial action. We could trace the rock of which the boulder consists back to the Lake District, which abounds in volcanic products. There were in a great many localities, both in Scotland and in England, volcanoes of various geological ages, which had poured out their lava in immense quantities. In the Lake District there were to be found many varieties of lava, to which were applied the general name of basalt. The boulder was a fragment of one of those ancient consolidated lavas. It was transported from the Lake District by means of an iceberg, which gradually melted as it came floating down until at last the stone got free from it and dropped down at Oxford-road, where it had now been found. There it had remained for hundreds of thousands of years until it had been found by the servants of the Manchester Corporation. He considered the stone to be one of the finest examples of a boulder stone that England could show.

**American Patents in 1887.**—The report of the American Commissioner of Patents for 1887 presents some very interesting figures. There were granted 21,378 patents, 1,466 being to citizens of foreign countries. New York leads the list with 4,047 patents, Pennsylvania being second with 2,109, and Massachusetts a close third, 1,875 patents being granted to citizens of that state. In the ratio of population to each patent granted, the Eastern States easily lead, Connecticut being first, with one patent to every 790 persons; the district of Columbia having one to every 845; and Massachusetts being third, with one to every 950 of her population. The people of the Southern States would appear to be very void of inventive genius, nearly all of them being at the foot of the list, Mississippi bringing up the rear with one patent to every 25,000 persons. It is of equal interest to note the increasing number of American patents that are being granted yearly. In 1837, 436 patents were granted, and the number in one year did not reach 10,000 until 1866, the maximum being reached in 1872, when the Government granted 25,548 patents. It is stated that this number would be exceeded but for the inability of the Patent Office with its present force and room to adequately dispose of the large number of applications being received, and the Commissioner makes an earnest appeal to Congress for more room at least, if not more assistance. The Commissioner also recommends the repeal of the law limiting the term of a United States patent, where the patent has already been granted in foreign countries, to the time of the foreign patent. This is considered an injustice to American inventors who desire to patent their inventions abroad.—*Iron.*

**Solicitors' Library, Edinburgh.**—The Society of Solicitors have selected six Edinburgh architects to send in designs for their new library buildings, which are estimated to cost 14,000*l*. Each competitor will receive a sum of twenty guineas. Designs have to be in by the end of April. The site is in the Cowgate, a little to the east of the new Edinburgh Public Library, and will have access from Parliament-square. The following are the names of the architects invited to compete, viz., Messrs. McGibbon & Rosse, Mr. G. W. Browne, Mr. James B. Dunn, Messrs. Blanc & Gordon, Mr. Sidney Mitchell, and Mr. Leadbetter.

**The Metropolitan Sewage.**—The Works and General Purposes Committee of the Metropolitan Board of Works have resolved to recommend to the Board that Sir Henry Roscoe, M.P., be appointed Consulting Chemist to the Board in connexion with the deodorization of the sewage and the purification of the River Thames, upon the terms and conditions stated in his letters, and during the pleasure of the Board. What those terms and conditions are there is no information on the *agenda* to show.

## PRICES CURRENT OF MATERIALS.

| TIMBER. | £. s. d. | £. s. d. |
|---|---|---|
| Greenheart, B.G. ....ton | 6 10 0 | 7 15 0 |
| Teak, E.I. ....load | 8 0 0 | 12 10 0 |
| Sequois, U.S. ....foot cube | 0 2 3 | 0 3 0 |
| Ash, Canada ....load | 3 0 0 | 4 10 0 |
| Birch ,, .... | 3 0 0 | 3 10 0 |
| Elm ,, .... | 3 10 0 | 4 10 0 |
| Fir, Dantsic, &c. .... | 1 19 0 | 4 0 0 |
| Oak ,, .... | 2 10 0 | 4 10 0 |
| Canada .... | 3 0 0 | 6 0 0 |
| Pine, Canada red .... | 2 0 0 | 3 10 0 |
| ,, yellow .... | 2 0 0 | 4 0 0 |
| Lath, Dantsic ....fathom | 3 0 0 | 5 0 0 |
| St. Petersburg .... | 4 0 0 | 5 10 0 |
| Wainscot, Riga ....log | 0 0 0 | 0 0 0 |
| ,, Odessa, crown.... | 2 10 0 | 3 0 0 |
| Deals, Finland, 2nd and 1st...std.100 | 7 10 0 | 9 0 0 |
| ,, 4th and 3rd .... | 6 0 0 | 8 0 0 |
| Riga .... | 5 10 0 | 7 10 0 |
| St. Petersburg, 1st yellow .... | 8 10 0 | 14 0 0 |
| ,, 2nd ,, .... | 7 0 0 | 8 0 0 |
| ,, white .... | 6 10 0 | 8 10 0 |
| Swedish .... | 6 15 0 | 15 0 0 |
| White Sea .... | 7 0 0 | 16 10 0 |
| Canada, Pine, 1st .... | 16 0 0 | 24 0 0 |
| ,, ,, 2nd.... | 10 0 0 | 15 10 0 |
| ,, ,, 3rd, &c.... | 7 0 0 | 9 10 0 |
| ,, Spruce, 1st .... | 8 0 0 | 9 10 0 |
| ,, ,, 3rd and 2nd.... | 5 0 0 | 7 0 0 |
| New Brunswick, &c.... | 5 0 0 | 7 0 0 |
| Battens, all kinds .... | 4 0 0 | 10 10 0 |
| Flooring Boards, sq., 1 in., prepared, First .... | 0 8 0 | 0 11 6 |
| Second .... | 0 6 6 | 0 7 6 |
| Other qualities .... | 0 4 0 | 0 6 0 |
| Cedar, Cuba ....foot | 0 0 3½ | 0 0 3½ |
| Honduras, &c. .... | 0 0 3 | 0 0 3½ |
| Australian .... | 0 0 2 | 0 0 3 |
| Mahogany, Cuba .... | 0 0 4½ | 0 0 7 |
| St. Domingo, cargo average .... | 0 0 4½ | 0 0 6 |
| Mexican ,, .... | 0 0 3½ | 0 0 3½ |
| Tobasco ,, .... | 0 0 4 | 0 0 5 |
| Honduras ,, .... | 0 0 4 | 0 0 5 |
| Maple, Bird's-eye .... .... | 0 0 5 | 0 0 7 |
| Rose, Rio ....ton | 8 0 0 | 11 0 0 |
| Bahia.... | 7 0 0 | 9 0 0 |
| Box, Turkey .... | 5 0 0 | 12 0 0 |

| TIMBER (*continued*). | £. s. d. | £. s. d. |
|---|---|---|
| Satin, St. Domingo ....foot | 0 0 5 | 0 0 9 |
| Porto Rico .... | 0 0 6 | 0 0 10 |
| Walnut, Italian .... | 0 0 4 | 0 0 5½ |
| **METALS.** | | |
| IRON—Bar, Welsh, in London...ton | 4 15 0 | 4 17 6 |
| ,, ,, in Wales .... | 4 5 0 | 4 10 0 |
| ,, Staffordshire, London .... | 5 10 0 | 7 0 0 |
| COPPER— | | |
| British, cake and ingot ....ton | 79 0 0 | 0 0 0 |
| Best selected .... | 80 0 0 | 0 0 0 |
| Sheets, strong.... | 90 0 0 | 0 0 0 |
| Chili, bars .... | 80 10 0 | 0 0 0 |
| YELLOW METAL....lb. | 0 0 7½ | 0 0 7½ |
| LEAD— | | |
| Pig, Spanish ....ton | 14 5 0 | 0 0 0 |
| English, common brands.... | 14 12 6 | 0 0 0 |
| Sheet, English .... | 15 10 0 | 15 15 0 |
| SPELTER— | | |
| Silesian, special ....ton | 19 10 0 | 19 15 0 |
| Ordinary brands.... | 19 5 0 | 0 0 0 |
| TIN— | | |
| Banca ....ton | 163 0 0 | 0 0 0 |
| Billiton .... | 163 0 0 | 0 0 0 |
| Straits .... | 166 10 0 | 0 0 0 |
| Australian .... | 166 10 0 | 0 0 0 |
| English ingots .... | 159 0 0 | 0 0 0 |
| Bars .... | 160 0 0 | 0 0 0 |
| ZINC— | | |
| English sheet ....ton | 22 0 0 | 23 0 0 |
| **OILS.** | | |
| Linseed ....ton | 18 10 0 | 18 15 0 |
| Cocoanut, Cochin .... | 27 10 0 | 29 0 0 |
| Ceylon .... | 24 10 0 | 0 0 0 |
| Palm, Lagos .... | 21 10 0 | 0 0 0 |
| Rapeseed, English pale .... | 24 0 0 | 24 10 0 |
| ,, brown .... | 22 10 0 | 22 15 0 |
| Cottonseed, refined .... | 20 15 0 | 0 0 0 |
| Tallow and Oleine.... | 25 0 0 | 45 0 0 |
| Lubricating, U.S.... | 5 0 0 | 6 0 0 |
| ,, refined.... | 5 0 0 | 12 0 0 |
| TURPENTINE— | | |
| American, in casks ....cwt. | 1 8 6 | 0 0 0 |
| TAR— | | |
| Stockholm ....barrel | 0 15 0 | 0 15 6 |
| Archangel .... | 0 10 0 | 0 10 6 |

# COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## COMPETITIONS.

| Nature of Work. | By whom required. | Premium. | Designs to be delivered. | Page. |
|---|---|---|---|---|
| New School Buildings .... | Guernsey School Com. | 10*l.*.... | April 20th | ii. |
| Plans, Laying-out Property, Douglas (I.M.) | Villiers Hotel Co., Lim. | 30*l.*, 15*l.*, and 5*l.* ... | June 1st | xi. |

## CONTRACTS.

| Nature of Work, or Materials. | By whom required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Bath-Room, &c., at Workhouse .... | Edmonton Union..... | T. E. Knigntley ..... | March 28th | xii. |
| Broken Granite .... | Ramsey Local Board ... | *Official* ..... | March 29th | ii. |
| Alterations to Court House, St. Alban ..... | Hertford Magistrates... | Urban A. Smith ..... | March 30th | xii. |
| Post-Mortem Room & Disinfectant Chamber | Chelsea Guardians ..... | A. & C. Harston ..... | April 4th | xii. |
| Cast-Iron Rising Mains .... | Leicester Corporation | J. Gordon ..... | April 5th | xi. |
| Additions to Laundry at Workhouse ..... | Greenwich Union..... | T. Dinwiddy ..... | do. | xii. |
| Sluice Cocks, Waste-Water Meters, &c. ..... | Northwich Local Board | H. Bancroft ..... | April 7th | xiii. |
| Pipes for Waterworks .... | do. | do. | do. | xiii. |
| Sewering and Making-good Roads .... | Hornsey Local Board ... | T. De Courcy Meade ...| | April 9th | xi. |
| Iron Girders for Bridge .... | Bristol U. S. A. ..... | F. Ashmead ..... | do. | xii. |
| Paving Streets .... | St. Giles's, Camberwell | *Official* ..... | do. | xii. |
| Removal of Dust .... | do. | do. | April 10th | xii. |
| Alterations, &c., to Infirmary Buildings ..... | Sevenoaks Union..... | T. Potter ..... | do. | xii. |
| Cottages, Moreton and Shipston Tramway ... | Great Western Ry. Co. | *Official* ..... | do. | xii. |
| Hot-Water Heating Apparatus, Glamorgan... | Visitors, C. Asylum..... | do. | do. | ii. |
| Alterations and Additions to Church ..... | Bracknell Church Ex. C. | S. Gambier Parry..... | April 12th | xii. |
| Refreshment Rooms, G. P. O. .... | Com. of H.M. Works... | *Official* ..... | April 13th | ii. |
| New Station at Wisbech .... | Great Eastern Ry. Co. | do. | do. | xii. |
| Warming Apparatus .... | School Brd. for London | do. | April 16th | xi. |
| Outfall Sewage Works, Crossness ..... | Met. Board of Works... | do. | April 20th | ii. |
| Machinery for Precipitation Works, Barking | do. | do. | do. | ii. |
| New Workhouse Buildings.... | St. Pancras Guardians | H. H. Bridgman ..... | April 26th | xi. |
| Enlargement and Additions to Schools ..... | School Brd. for London | *Official* ..... | Not stated... | xi. |
| Repairs to School Buildings .... | do. | do. | do. | xi. |
| Barrack Buildings, &c.... | Salvation Army..... | E. J. Sherwood..... | do. | ii. |
| Barracks Buildings, Kilburn .... | do. | do. | do. | xi. |
| Erection of Church, Cinderford .... | ..... | E. H. Lingen Barker... | do. | xi. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page |
|---|---|---|---|---|
| Building Inspector .... | Willesden Local Board | 150*l.* ..... | March 27th | xvii. |

## TENDERS.

*** **Next Week,** communications for insertion under this heading must reach us *not later than* 12 *Noon on* **Wednesday,** as we go to Press a day earlier than usual.

ASHTEAD (Surrey).—For building stable, coach-house, and loft, for Miss Coates. Mr. Lionel Littlewood, architect, 9, Great James-street, W.C.:—

| | |
|---|---|
| Skilton, Leatherhead .... | £117 10 0 |

BARNET.—For a small Factory Building at Barnet, for Mr. A. Emm. Mr. Joseph White, High-street, Barnet, surveyor:—

| | |
|---|---|
| Butcher .... | £615 0 0 |
| J. Baughen.... | 539 0 0 |
| Williams .... | 508 0 0 |
| V. Grey .... | 481 4 6 |
| Curnow .... | 469 0 0 |
| Voller (accepted).... | 435 0 0 |
| Julian .... | 404 0 0 |

[Tenders sent by Austin and Pearce too late.]

BECKENHAM (Kent).—For the erection of billiard-room and alterations to hall and staircase at Fairview, Knoll-road, Beckenham. Mr. Francis Hooper, A.R.I.B.A., architect:—

| | |
|---|---|
| Syme & Duncan, Beckenham (accepted)... | £420 0 0 |

BRIGHTON.—For alterations and additions to the Military Riding Academy, Waterloo-street. Mr. A. C. Udny, P.A.S.I., surveyor:—

| | |
|---|---|
| W. & G. Garrett .... | £2,450 0 0 |
| Longley & Son .... | 2,425 0 0 |
| W. Parsons .... | 2,349 0 0 |
| J. Barnes .... | 2,347 0 0 |
| T. T. Chappell .... | 2,197 0 0 |

COVENTRY.—For the erection of two houses, Cheylesmore, Coventry, for Mr. B. Turrall:—

| | |
|---|---|
| Hill .... | £450 0 0 |
| Worwood .... | 423 0 0 |
| Mayo .... | 375 0 0 |
| Haywood .... | 372 0 0 |
| Cave (accepted) .... | 343 0 0 |

[All of Coventry.]

CROMER.—For shop and house in Garden-road, for Mr. George Breese. Mr. George J. Skipper, architect and surveyor, Norwich. Quantities supplied by the architect:—

| | |
|---|---|
| W. Chapman, Hanworth .... | £710 0 0 |
| Cornish & Gaymer, North Walsham... | 707 10 0 |
| John Thompson, Peterborough .... | 656 0 0 |
| R. Bartram, Aylsham .... | 649 10 6 |
| John Newman, Cromer (accepted).... | 648 0 0 |

EAST DEREHAM.—For alterations and additions to the London-road and Toftwood Schools, for the East Dereham School Board. Messrs. George J. & F. W. Skipper, architects and surveyors, Norwich and East Dereham:—

| | London-road Schools. | Toftwood Schools. |
|---|---|---|
| Allen .... | £825 0 0 | £170 0 0 |
| Pearce .... | 790 12 5 | 160 0 0 |
| Larner (accepted) ... | 764 10 0 | 149 10 0 |

EAST DEREHAM.—For the erection of new Gas-works, for the Local Board of East Dereham. Mr. F. W. Skipper, architect and surveyor. Quantities supplied by the architect:—

| | |
|---|---|
| W. Larner .... | £1,625 0 0 |
| R. Mayes (accepted) .... | 1,447 7 6 |

EAST DEREHAM.—For alterations and additions to residence of Mr. F. W. Count. Mr. F. W. Skipper, architect and surveyor:—

| | |
|---|---|
| R. Mayes (accepted) .... | £129 0 0 |

ENFIELD.—For additional wing to the Enfield Cottage Hospital, for the Committee. Mr. C. Stuart Robertson, architect, Enfield:—

| | |
|---|---|
| Fairhead.... | £423 0 0 |
| Patman .... | 393 0 0 |
| Brooks & Meader.... | 332 0 0 |

FULHAM.—For re-building the King's Arms public-house, High-street, Fulham, for Mr. E. A. Cook. Mr. Robert Roper, 58, Mile End-road, architect. Quantities by Mr. A. Howard, Mackenzie-road, Beckenham:—

| | |
|---|---|
| Wood .... | £6,639 0 0 |
| Cox .... | 6,579 0 0 |
| Lamble.... | 6,128 0 0 |
| Nye .... | 6,083 0 0 |
| Burman .... | 6,060 0 0 |
| Walker.... | 6,041 0 0 |
| Higgs .... | 5,942 0 0 |
| J. Dennis .... | 5,857 0 0 |
| Holland .... | 5,842 0 0 |

HANDSWORTH.—For the erection of an additional class-room, &c., to the St. James's National Schools. Mr. J. R. Nichols, architect, 59, Colmore-row, Birmingham:—

| | |
|---|---|
| R. Loughton, Birmingham .... | £350 0 0 |
| Walton Bros., Smethwick.... | 320 0 0 |
| Barker & Son, Handsworth .... | 318 0 0 |
| John Horsley & Co., Birmingham ..... | 289 0 0 |
| John Webb, Birmingham .... | 285 0 0 |
| William Fisher, West Bromwich ..... | 279 0 0 |
| W. F. Bott, Aston .... | 278 0 0 |
| S. W. Fielding, Edgbaston .... | 275 6 0 |
| John Dallow, Blackheath .... | 269 0 0 |
| Arthur Wilkes, West Bromwich..... | 249 0 0 |
| Love & Flint, Dudley.... | 247 10 0 |
| H. Dorse & Son, Cradley Heath ..... | 235 0 0 |
| Innes & Wood, Handsworth.... | 235 0 0 |
| C. A. Horton, Brierley Hill (accepted) | 210 0 0 |

HARROW.—For making-up Grange-road, for the Harrow Local Board. Mr. Fredk. Cowell, surveyor:—

| | |
|---|---|
| John Griffin, Netherwood, Kilburn ... | £242 0 9 |
| W. Seward, Hanwell .... | 163 19 9 |
| G. R. Rackham, Oak-terrace, Blackheath .... | 139 0 0 |
| T. Hall, Rugby.... | 137 15 1½ |
| H. Haynes, Alperton.... | 137 10 9 |
| T. Torode, Rangemore-terrace, Tottenham .... | 134 13 6 |
| H. Drury, Wealdstone, Harrow ..... | 130 6 9 |
| Thomas Adams, Canal-road, Kingsland | 127 16 10 |
| G. Bean, Harrow (accepted) .... | 128 2 3 |

[Surveyor's estimate, £154.]

ILFORD (Essex).—For workshops, &c., at St. Nicholas Industrial School, Little Ilford, Essex. Mr. J. C. Hall, architect:—

| | |
|---|---|
| J. Morter, Stratford, E. .... | £1,470 0 0 |
| M. Calnan & Co., 238, Commercial-road, E. (accepted) .... | 1,317 0 0 |

KENSINGTON.—For building sculptor's studio and modelling rooms. Mr. Lionel Littlewood, architect, 9, Great James-street, W.C.:—

| | |
|---|---|
| Ham, Kensington.... | £530 0 0 |
| Kent, Fulham-road.... | 510 0 0 |
| Jones, Westbourne Park .... | 477 17 0 |
| Liney, Kensington Court (accepted)... | 438 0 0 |

LAMBETH.—For fittings and fixtures at the Workhouse, Princes-road, S.E., for the Guardians of the Poor of the Parish of Saint Mary, Lambeth. Mr. Thomas W. Aldwinckle, 2, East India-avenue, Leadenhall-street, E.C., architect:—

| | |
|---|---|
| J. Mills .... | £1,410 0 0 |
| W. Smith.... | 1,367 0 0 |

LAMBETH.—For fire-extinguishing apparatus at the Workhouse, Princes-road, S.E., for the Guardians of the Poor of the Parish of Saint Mary, Lambeth. Mr. Thomas W. Aldwinckle, architect:—

| | |
|---|---|
| Merryweather & Sons.... | £325 0 0 |
| J. H. Heathman & Co. .... | 320 0 0 |
| Shand, Mason & Co. (accepted) ..... | 299 10 0 |

LONDON.—For pewterer's work at Mouflet's Hotel, Newgate-street, E.C., for Mr. R. H. Barnes. Mr. H. I. Newton, architect, 17, Queen Anne's Gate, Westminster:—

| | |
|---|---|
| Watts & Co. .... | £128 17 0 |
| W. Helling .... | 103 0 0 |
| T. Heath .... | 99 0 0 |
| Sanders & Sons (accepted) .... | 94 0 0 |

[Tenders for general works appeared last week, p. 201.

LINCOLN.—For the erection of additions to the Small-pox Hospital on the West Common and Race-course, for the Corporation of the City of Lincoln. Mr. MacBrear, surveyor:—

| | | | |
|---|---|---|---|
| J. M. Harrison | £475 | 0 | 0 |
| Otter & Broughton | 475 | 0 | 0 |
| Henry Allman | 467 | 2 | 6 |
| H. S. & W. Close | 466 | 15 | 0 |
| Jackson & Buttery | 463 | 2 | 6 |
| Wright & Sons | 456 | 0 | 0 |
| Lansdown & Son | 448 | 0 | 0 |
| S. & R. Horton | 445 | 0 | 0 |
| J. W. Harrison | 431 | 0 | 0 |
| George Cowen | 430 | 0 | 0 |
| John Brooks | 429 | 10 | 0 |
| J. Crosby & Sons | 429 | 0 | 0 |
| J. B. Harrison | 428 | 19 | 0 |
| J. H. Woolhouse (accepted) | 423 | 6 | 9 |

LONDON.—For alterations, &c., to the Distillers' Arms, Albert Embankment, for Mr. George Day. Mr. Edward Clark, architect, 432, West Strand, W.C. Quantities by the architect:—

| | | | |
|---|---|---|---|
| John Beale, Westminster Bridge-road (accepted) | £1,166 | 0 | 0 |

[Full list given last week, p. 200.]

NEW BARNET.—For a detached cottage at New Barnet. Mr. Joseph White, surveyor:—

| | | | |
|---|---|---|---|
| J. Ellwood (accepted) | £405 | 0 | 0 |

[No competition.]

NEWPORT (Mon.).—For St. Mark's Schools, Queen's-hill, Newport. Messrs. W. G. Habershon & Fawckner, architects, Newport:—

| | | | |
|---|---|---|---|
| T. Goldsworthy | £1,580 | 0 | 0 |
| W. Price | 1,448 | 0 | 0 |
| W. Jones & Co. | 1,395 | 0 | 0 |
| J. Williams & Son | 1,372 | 0 | 0 |
| Moulton & Brownscombe | 1,349 | 0 | 0 |
| C. Miles | 1,340 | 0 | 0 |
| G. Wilkins | 1,320 | 0 | 0 |
| W. Blackburn | 1,293 | 0 | 0 |
| J. Linton | 1,290 | 0 | 0 |

[All of Newport.]

NORWOOD.—For tramway stables, West Norwood, for the London Southern Tramways Company. Messrs. Karslake & Mortimer, architects, 5, Great Queen-street, Westminster. Quantities by the architect:—

| | | | |
|---|---|---|---|
| Marsland | £3,305 | 0 | 0 |
| Higgs & Hill | 3,194 | 0 | 0 |
| Holliday & Greenwood | 2,989 | 0 | 0 |
| Lidstone | 2,915 | 0 | 0 |
| F. & H. Higgs | 2,898 | 0 | 0 |
| A. M. Deacon & Co.* | 2,854 | 0 | 0 |

* Accepted, after deductions made.

SOUTH NORWOOD.—For the erection of five houses and converting four others into three in the Harrington and Cresswell roads, South Norwood, for the Misses Clark. Mr. Gordon M. Hills, architect, 4, Adam-street, Adelphi, W.C.:—

| | | | |
|---|---|---|---|
| Hunt, Chiswick | £3,095 | 0 | 0 |
| Troughton & Sons, London | 2,887 | 0 | 0 |
| Smith & Sons, Norwood | 2,787 | 0 | 0 |
| Jarvis & Sons, London | 2,664 | 0 | 0 |
| Bryan, Norwood | 2,656 | 0 | 0 |
| Page, Croydon | 2,585 | 0 | 0 |

After certain modifications and additional houses the tender of Mr. S. Page, Croydon, was accepted at £4,100.

SYDENHAM. — For repairs, &c., to Southwood, Sydenham-hill, for Mrs. H. King:—

| | | | |
|---|---|---|---|
| Nixon | £268 | 0 | 0 |
| T. Watson (Dulwich) | 188 | 0 | 0 |
| Poole | 164 | 0 | 0 |

UPTON PARK.—For new roads and sewers on the Plashet Cottage Estate, Upton Park, E., and other works. Messrs. E. E. Croucher & Co., surveyors, 76, Chancery-lane, W.C.:—

| | | | |
|---|---|---|---|
| Wilson | £1,364 | 0 | 0 |
| Jackson | 1,286 | 0 | 0 |
| Reeves | 1,777 | 0 | 0 |
| Bell | 1,208 | 0 | 0 |
| Adams (accepted) | 1,155 | 0 | 0 |
| Carter | 1,100 | 0 | 0 |

WANDSWORTH.—For alterations and repairs to Nos. 1 and 2, Champion-terrace, for the Guardians of the Poor of the Wandsworth and Clapham Union. Mr. Thomas W. Aldwinckle, architect:—

| | | | |
|---|---|---|---|
| Tuttle & Appleton | £375 | 0 | 0 |
| W. Buckeridge | 352 | 0 | 0 |
| W. Hammond | 340 | 0 | 0 |
| W. J. Beale | 336 | 10 | 0 |

WANDSWORTH.—For fire-extinguishing apparatus at the Infirmary Extension, St. John's-hill, for the Guardians of the Poor of the Wandsworth and Clapham Union. Mr. Thomas W. Aldwinckle, 2, East India-avenue, Leadenhall-street, E.C., architect:—

| | | | |
|---|---|---|---|
| Wenham & Waters | £280 | 0 | 0 |
| Shand, Mason & Co. (accepted) | 219 | 10 | 0 |
| J. Morris & Sons (for materials only) | 154 | 3 | 0 |

WATFORD.—For the erection of the Watford Lock-up. Mr. Urban A. Smith, County Surveyor:—

| | | | |
|---|---|---|---|
| W. Haselgrove, Luton | £6,475 | 0 | 0 |
| Andrews & Sons, Watford | 6,275 | 0 | 0 |
| John White, Bedford | 6,185 | 0 | 0 |
| Marriot Bros. High Barnet | 6,162 | 0 | 0 |
| S. Grist, Aylesbury | 6,058 | 0 | 0 |
| Ellwood & Son, Sandy | 5,990 | 0 | 0 |
| W. A. Rhodes, London | 5,850 | 0 | 0 |
| Willmott & Son, Hitchin | 5,846 | 0 | 0 |
| Thos. Turner, Limited, Watford | 5,839 | 0 | 0 |
| Judge & Eames, Watford | 5,796 | 0 | 0 |
| Christr. Miskin, St. Albans | 5,700 | 0 | 0 |
| Arthur Bunting, Fenstanton | 5,694 | 0 | 0 |
| W. M. Dabbs, London | 5,580 | 0 | 0 |
| S. T. Bonnett, Watford | 5,492 | 0 | 0 |
| G. & J. Waterman, Watford | 5,396 | 0 | 0 |
| F. Dupont, Colchester (accepted) | 5,185 | 0 | 0 |
| Edwin Jarvis, Banbury | 5,000 | 0 | 0 |

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A. M. (book received).—J. P.—J. M.—W. A. M. & Co.—D. M. J. G.—J. W.—B. C. & Co. (too late).—W. H. (too late for this week).—Lists of tenders from W. A. B., A. W. S., H. A. A., M. C. & Co., and G. St. P. H. (all too late for this week).—Correspondents will please observe notice for next week, when we go to press a day earlier than usual.

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